



PROCEEDINGS | **1805**

Strategic Planning for Long-term Financing of Pacific Leatherback Conservation and Recovery



Strategic Planning for Long-term Financing of Pacific Leatherback Conservation and Recovery



Jointly published by The WorldFish Center, PO Box 500 GPO, 10670 Penang, Malaysia and National Oceanic and Atmospheric Administration, National Marine Fisheries Service Southwest Fisheries Science Center, La Jolla, California 92037, USA and the Western Pacific Regional Fishery Management Council, Honolulu, Hawaii 96813, USA.

This publication should be cited as:

Steering Committee, Bellagio Sea Turtle Conservation Initiative. 2008. Strategic Planning for Long-term Financing of Pacific Leatherback Conservation and Recovery: Proceedings of the Bellagio Sea Turtle Conservation Initiative, Terengganu, Malaysia; July 2007. WorldFish Center Conference Proceedings 1805, The WorldFish Center, Penang, Malaysia. 79 p.

ISBN 978-983-2346-62-3

WorldFish Center Contribution No. 1805

Cover photos by: Heidi Gjertsen and Scott Eckert

Printed by Yale Printers Sdn Bhd

Design and layout by Visual Solution

This document has not been peer reviewed. The views presented in these papers are those of the authors and do not necessarily represent those of The WorldFish Center, its partners or the organizations that provided funding for the publication.

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List of Acronyms

BSSE	Bismarck Solomon Seas Ecoregion
CI	Conservation International
DEC	Department of Conservation
FFA	Forum Fisheries Agency
FWS	Fish and Wildlife Service
IATCC	Inter American Tropical Tuna Commission
IOSEA-MoU	Indian Ocean and South-East Asia Memorandum of Understanding
IUCN	World Conservation Union
NFWF	National Fish and Wildlife Foundation
NMFS-SWFSC	National Marine Fisheries Service Southwest Fisheries Science Center
OFP	Offshore Fisheries Program
SEAFDEC	Southeast Asian Fisheries Development Center
SPC	Secretariat of the Pacific Community
SPREP	Secretariat of the Pacific Regional Environment Programme
SSME	Sulu-Sulawesi Marine Ecoregion
TED	Turtle Excluder Device
TIHPA	Turtle Islands Heritage Protected Area
TNC	The Nature Conservancy
WCPFC	Western and Central Pacific Fisheries Commission
WPRPMC	Western Pacific Regional Fishery Management Council
WWF	World Wildlife Fund

Preface

On July 17-20 2007, 45 experts on sea turtles, fisheries, conservation, and finance from 10 countries convened at The Bellagio Sea Turtle Conservation Initiative workshop in Terengganu (hereafter called the Terengganu workshop) to save the imperiled Pacific leatherback from extinction. The group developed a strategic plan to guide the prioritization and long-term financing of Pacific leatherback turtle conservation and recovery objectives. Participants identified critical conservation actions and agreed that a business plan is urgently needed to reverse the trajectory towards extinction of the Pacific leatherback. The conservation actions prioritized by the participants encompassed protecting nesting beaches including eggs and nesting females; reducing direct and indirect turtle take in coastal fisheries; and strengthening regional and sub-regional cooperation. The group committed to work together on fundraising and implementation of these urgent conservation actions. This report presents the plan that was produced from the workshop.

The Terengganu workshop was the second in a series which was initially convened in Bellagio, Italy in November 2003 from which *The Bellagio Blueprint*¹, a document containing steps to conserve all sea turtle species from extinction was produced. *The Blueprint* incorporated ideas, proposals and information from participants from a range of disciplines and backgrounds. Participants considered the multitude of issues related to sea turtle conservation, management and recovery. The central themes of *The Blueprint* are:

- (1) The protection of all nesting beaches.
- (2) Reducing turtle take in at-sea and coastal fisheries.
- (3) Stimulating pan-Pacific policy actions.
- (4) Encouraging the sustainability of traditional use of sea turtles.

Much was accomplished in the interim since the 2003 Bellagio Conference, with progress in a number of different fora and by a number of different entities. The second workshop was organized to further this progress by applying and operationalizing the *Bellagio Blueprint* for saving Pacific sea turtles. The purpose was to develop a detailed strategic plan that can be used by governments, management authorities, relevant agencies and NGOs to guide the prioritization and long-term financing of Pacific leatherback turtle conservation and recovery objectives. As a first step, the meeting focused on actions to save the Western Pacific nesting leatherbacks as one component

1 http://www.wpcouncil.org/protected/Documents/Blueprint_2003.pdf

of a broader pan-Pacific plan. Meeting participants further stressed the need for a similar level of effort to accelerate Eastern pan-Pacific planning and action and encouraged experts from that region to do so.

Participants examined information from recent studies on Western Pacific leatherbacks, including the work that has provided greater definition of nesting beaches, including a new beach identified in Papua, Indonesia. Participants were asked to explore successes and progress since Bellagio, identify gaps or areas where action has not been taken or has not been successful, and prioritize next steps. Given that financing is critical for sea turtle conservation activities, a key focus of the workshop included developing a long-term financing strategy to provide continuity and ensure long-term success of Pacific leatherback turtle conservation and recovery.

This publication was compiled by the following individuals who also acted as the Steering Committee:

- Kitty Simonds, Western Pacific Regional Fishery Management Council (Executive Conference Producer)
- Meryl Williams, Australia (Chair)
- Paul Dalzell, Western Pacific Regional Fishery Management Council (Co-organizer)
- Peter Dutton, National Marine Fisheries Service (Co-organizer)
- Heidi Gjertsen, National Marine Fisheries Service (Co-organizer)
- Dale Squires, National Marine Fisheries Service (Co-organizer)

The Terengganu workshop co-organizers and co-sponsors, the Western Pacific Regional Fishery Management Council (WPRFMC) and National Marine Fisheries Service Southwest Fisheries Science Center (NMFS-SWFSC), would like to thank YB Toh Chin Yaw, Chairman of the Terengganu State Health, Unity, Consumer Affairs and Environmental Committee for officiating the workshop and Tn. Hj. Munir Hj. Nawi, Director of the Department of Fisheries Terengganu for providing a talk on the Ma'Daerah Turtle Sanctuary.

The co-organizers would also like to acknowledge the tremendous assistance provided by The WorldFish Center in coordinating the workshop logistics (Li Ping Ng and James Tan) and publication of the proceedings (Bee Hong Yeo). The co-sponsors also acknowledge and thank the Department of Fisheries of Terengganu and WWF-Malaysia for providing logistics support for the field visit to the Ma'Daerah Turtle Sanctuary by the workshop participants. Efforts from participants that traveled from far and near provided the important basis for these proceedings. Their commitment and active participation are gratefully acknowledged.

The Steering Committee

Bellagio Sea Turtle Conservation Initiative
June 2008

Context

The World Conservation Union (IUCN) has already listed leatherbacks globally as critically endangered – which means they face an extremely high risk of extinction in the wild. Some 95 percent of these giant, charismatic animals have vanished in the last 20 years due to human activities such as egg poaching, loss of nesting beaches, hunting of adults and accidental captures in fisheries. Conservation and recovery do not take place immediately. Successful conservation requires long-term commitments over many decades by local communities as well as dedication by government, managers and scientists; much of which is dependent upon adequate financial resources. Although valuable and important steps have been undertaken over the past few years, without a clear plan of action and guaranteed long-term funding, we face the very real prospect of losing this initial positive momentum.

“We all realize that we have to act now before the last remaining populations disappear. We need to boost hatchling production now on the nesting beaches, and ensure that the juveniles and adults survive in the ocean.”

--Peter Dutton, National Marine Fisheries Service (NMFS)

Leatherback populations throughout the Pacific have collapsed, and while there are still relatively large numbers of leatherbacks nesting on the Birdshead Peninsula of Papua, there is great concern that without immediate action to ensure effective nesting beach conservation, this remaining population will

also disappear. There are opportunities to immediately enact conservation measures through community-based initiatives on the nesting beaches to dramatically increase hatchling production before these populations collapse. Two key actions that were discussed in Terengganu were the promotion of increased recruitment of hatchlings from nesting sites, and the minimization of interactions with coastal fisheries in waters adjacent to nesting grounds and in the migratory pathways to inter-nesting areas and foraging grounds. What is urgently needed is a wise management strategy that will maximize nest protection and optimize hatchling production. Sufficient numbers of hatchlings must enter the population each year and adequate numbers must survive to sexual maturity in order to reverse population declines. Protection of nests and nesting females on the beach are a vital and necessary component of a holistic approach to recovering depleted leatherback populations. This approach includes reducing mortality in high seas and coastal fisheries.

To address these issues, 45 experts on sea turtles, fisheries, conservation, and finance from 10 countries met in Terengganu, Malaysia from July 17-20 2007, to devise a plan to save the Pacific leatherback. The workshop was officiated by the Chairman of Terengganu State Health, Unity, Consumer Affairs and Environmental Committee, YB Toh Chin Yaw. In his speech, YB Toh emphasized the importance of collaborative efforts for the conservation

of sea turtles and was confident that the participants would make progress towards reversing the current decline of the Pacific leatherback. Ms. Kitty Simonds, Executive Director of the Western Pacific Regional Fishery Management Council (WPRFMC), in her welcome remarks highlighted that this landmark meeting provides the opportunity for an internationally diverse group to develop a consensus on how to proceed to ensure the financial security for the conservation programs to save the remaining leatherback turtles in the Western Pacific. The survival and ultimate recovery of leatherback turtles is dependent upon the continued collaboration and creative vision of the international community collectively (see Appendix 1).

The workshop participants achieved the following:

1. Drafted a detailed *Business Plan* outline for recovery of leatherbacks.

Participants agreed that a business plan is needed urgently as an important basis for a much needed funding initiative to stop the Pacific leatherbacks' decline towards extinction.

The business plan will be used to guide the development of a Pacific leatherback conservation fund. The participants drafted an outline of the plan and made the strong case that additional funds and other resources are needed to accelerate existing leatherback conservation actions and sustain them over the long-term. The complete business plan was submitted in December 2007 and revised in February 2008.

2. Determined the critical conservation actions necessary for long-term Pacific leatherback protection.

While the business plan will provide the basis for financing Pacific leatherback recovery, the workshop focused as a first step on bringing together expertise to develop a detailed action plan for implementing critical conservation actions for the Western Pacific leatherback population. This includes protecting nesting beaches, including eggs and nesting females, reducing direct and indirect catch of leatherbacks in coastal fisheries, and regional and sub-regional cooperation. Although workshop participants recognized that other actions are equally important (e.g. addressing high seas fishery impacts), the workshop focused on the most tractable problems and on activities and areas where immediate actions are likely to produce measurable results. One of the important activities of the workshop was to identify areas that are facing critical conservation action gaps (i.e. major underinvestment).

3. Developed a Pacific leatherback fundraising strategy called 'Come Back Leatherback' and committed to work together on fundraising for this conservation fund.

The draft business plan foreshadows that, as a matter of urgency, funds need to be directed towards maintaining and building local capacity in the key Western Pacific leatherback nesting countries, especially by making long-term investments in the communities and fishers living and working around nesting beaches.

Critical Conservation Actions for Pacific Leatherbacks

The Terengganu workshop focused on applying and operationalizing the *Bellagio Blueprint* for saving Pacific sea turtles to the Western Pacific nesting leatherbacks as one component of a broader pan-Pacific plan. Thus the working groups at the workshop ensured that the critical conservation actions fit within the four *Bellagio Blueprint* themes. At this workshop, the four critical actions were identified as the following:

1. Protecting nests and beaches.
2. Reducing captures by coastal fisheries, particularly adjacent to nesting beaches.
3. Supporting existing regional conservation schemes.
4. Securing innovative financing to implement priority actions.

The working groups reviewed past and current work, discussed gaps, and prepared action plans for critical initiatives identified. The complete working group products are contained in Appendix 2 to 5.

Action 1: Protect Nests and Beaches

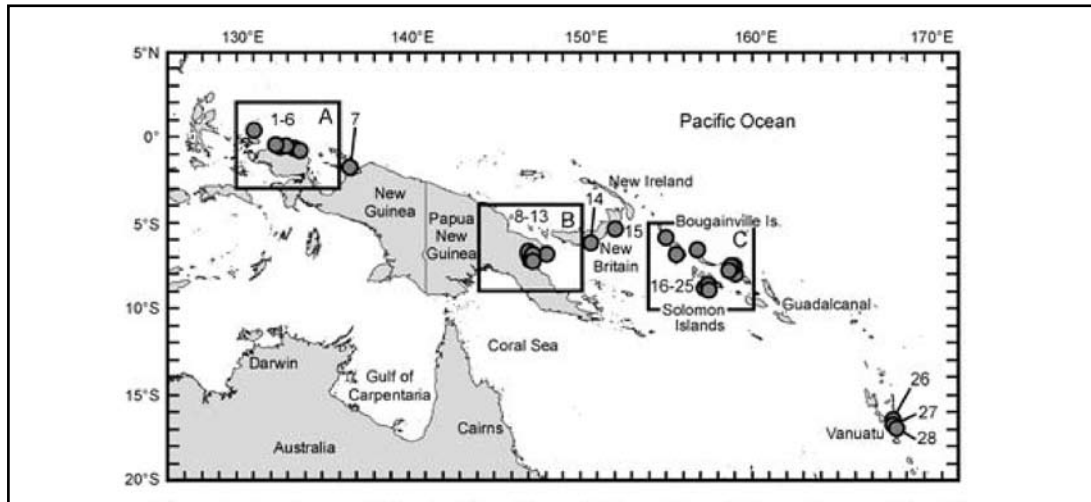
The priority for protecting nesting beaches, especially for leatherbacks was highlighted in the *Bellagio Blueprint* as well as in other regional fora such as the Indian Ocean and South-

East Asia Memorandum of Understanding (IOSEA-MoU), and the Bismarck Solomon Seas Ecoregion (BSSE) Tri-National Memorandum of Understanding between Indonesia, Papua New Guinea (PNG), and Solomon Islands to coordinate conservation of leatherbacks.

Recent studies show that the Western Pacific leatherbacks consist of a meta-population comprised of scattered small aggregations nesting on the islands and areas throughout the region, with a dense focal point on the northwest coast of Papua, Indonesia (Dutton et al. 2007). Figure 1 indicates these 28 areas on a map. Please see Dutton et al. (2007) for further details. The Western Pacific harbors some of the last remaining leatherback nesting aggregations of significant size. Although there are still hundreds of turtles nesting, 75 percent of these occur in one area on the north coast of Papua (Indonesia) and researchers are concerned by new information indicating that the majority of nests laid are not producing hatchlings. Some community-based beach and nest protection procedures have been developed to improve hatching success, creating hope that application of these techniques now will ensure that populations are sustained in the future.

Protecting nesting habitats and nests is a simple and necessary condition as well as a cost-effective way to ensure the long-term survivability of leatherbacks. A growing number of examples indicate that sea turtle populations increase as a response to long-term beach protection (Chaloupka et al. 2008;

Figure 1. Locations of significant (>20 nests/season) nesting sites for leatherbacks identified in the Western Pacific



Source: Dutton et al. 2007.

Dutton et al. 2005). However, despite some conservation steps, populations in Terengganu, Malaysia have collapsed and dramatic declines have also occurred at key leatherback nesting beaches in the Eastern Pacific. Accordingly, more effective nesting beach management and actions to minimize other threats such as the incidental capture of nesting leatherbacks in coastal fisheries adjacent to nesting beaches are required.

The nesting beach working group reviewed in detail each of the leatherback nesting sites in the Western Pacific, and identified where the nesting beaches were located, the current status of nesting and conservation efforts, and in some cases the bycatch of leatherbacks in gillnets and other fishing gears. The group also considered the physical characteristics of the nesting beaches; human populations adjacent to the beaches and their economic and social circumstances; local authorities and other organizations responsible for conservation; and other relevant issues associated with each site.

Currently, Jamursba-Medi and Wermon beaches in Papua (Indonesia) host the largest nesting population in the Pacific, with 1,800 to

3,600 nests laid per season in Jamursba-Medi and approximately 2,500 nests at Wermon (Hitipeuw et al 2007; Dutton et al. 2007). Local villagers monitor and patrol the beaches, but additional efforts are needed to increase the number of hatchlings that enter the water each year. The Huon Coast of the Morobe Province hosts 50 percent of leatherback nesting in Papua New Guinea, but impacts to nesting beaches are severe due to egg harvesting by villagers, beach erosion and wave inundation and predation by village dogs. In the Solomon Islands, egg collection and the killing of turtles for food have drastically reduced the leatherback nesting population. However, important nesting sites still occur at Isabel Island and at Rendova and Tetapare in the Western Province, and thus population recovery is still possible through dedicated conservation actions. Other threats, such as traditional take of adults and juveniles on foraging areas in the Kei Islands (Suarez and Starbird 1996), or nesting females, and incidental capture on high seas and coastal fisheries are also issues of concern, and need to be addressed as part of a broad suite of measures in order to achieve population recovery in the long run (Dutton and Squires 2008).

The action plan developed by the working group is contained in Appendix 2 and describes nesting beach activities and management needs in 1) Papua, Indonesia; 2) Papua New Guinea; 3) the Solomon Islands; 4) Vanuatu; 5) Malaysia; and 6) Vietnam. The group recognized that there are other Indo-Pacific nesting sites that have not been included in this plan. Significant nesting is thought to occur in Sri Lanka at the Andaman and Nicobar Islands, and other sites may be identified as research progresses. For each country, information is provided on the current situation, a list of issues to be addressed followed by a description of each issue, current and future actions required to address the issues, and proposed performance metrics. Issues common to most of the nesting beaches include the following:

- 1) Low hatching success and population recruitment as a result of:
 - a) predation,
 - b) inundation and erosion, and
 - c) elevated sand temperatures.
- 2) Lack of standardized methods for reliable monitoring and conservation.
- 3) Exploitation of females and eggs.
- 4) Lack of legal protection/protected areas.
- 5) Need for non-index beach surveys and conservation.

In addition, the group discussed the need for a national legal framework in Malaysia and a number of other actions in Vietnam, including increasing basic research, training and capacity building, public awareness, and reducing bycatch of leatherbacks in gillnets and other fishing gear.

In addition to the country-based actions, the working group discussed actions to foster a regional conservation network. These include starting an exchange program (researchers, community members, etc.), sharing of educational materials, building management capacity, convening an annual leatherback working group meeting (to review performance metrics, coordinate research strategy, etc.), and incorporating the action plan into appropriate existing regional plans such as the Bismarck Solomon Seas Ecoregion (BSSE) Tri-National MoU (Papua New Guinea-Solomon Islands-Indonesia), the Sulu-Sulawesi Marine Ecoregion (SSME) Action Plan (Malaysia-Philippines-Indonesia), the Turtle Islands Heritage Protected Area (TIHPA) (Malaysia-Philippines), the Indian Ocean and South-East Asia Memorandum of Understanding (IOSEA-MoU), and the Secretariat of the Pacific Regional Environment Program (SPREP).

Action 2: Reduce Captures by Coastal Fisheries, Particularly Adjacent to Nesting Beaches

The *Bellagio Blueprint* identified the need to reduce fishery interactions on the high seas and in coastal waters. The working group noted that since 2003, many countries have started testing mitigation measures expected to reduce leatherback interactions and mortality in high seas pelagic longline fisheries, and some have adopted the use of better gear and handling procedures to release turtles with minimum harm. Workshop participants acknowledged that more information is required about the interactions of leatherbacks with coastal fisheries, particularly in the vicinity of nesting beaches, where the high density of breeding turtles increases the likelihood of interactions. Models of sea turtle population dynamics clearly show the critical role that the protection of the adult reproductive segment of the population has for the conservation of the

species. Breeding adults come into contact with coastal fisheries as they migrate to and from the nesting beaches, during nesting, and in the inter-nesting habitat. In addition, the impact of climate change on oceanic conditions could alter both fishing patterns, turtle movements and the physical characteristics of nesting beaches.

Following the *Bellagio Blueprint*, the Terengganu workshop chose initially to focus on coastal fisheries impacts in Southeast Asia and Melanesia. However, participants were at pains to emphasize that it should not be interpreted as a prioritization of research, conservation and management efforts solely for Western Pacific populations, as opposed to those in the Eastern Pacific Ocean. Indeed the group recognized the crucial need for a complementary effort for the Eastern Pacific Ocean to heighten existing leatherback protection. Rather, it was understood that there might be a brief window of opportunity to immediately enact critical actions in the Western Pacific before remaining populations collapse and recovery efforts become much more challenging, costly, and drawn out.

Workshop participants noted the major differences between the density and range of fishing in the coastal zone between Southeast Asia and the Melanesian Islands (Papua, Indonesia; Papua New Guinea; Solomon Islands; Vanuatu). The coastal waters of Southeast Asia are heavily fished by a variety of gill nets, trawls, fish traps, and a range of different hook and line gears, involving hundreds of thousands of fishers. Within this densely populated and heavily exploited coastal margin, leatherbacks must migrate, forage and nest. By contrast, the coasts of Melanesia are less densely populated and fishing markedly less intense, with a much narrower range of fishing gears, primarily handlines, small gill and seine nets and spears. Indeed, the Southeast Asian situation may be more comparable to that in Central and South America, where similar densities of fishers

deploy a variety of gears, including longlines and gillnets, which accidentally catch turtles. However, despite the less intensive fishing in Melanesia, the meeting agreed that fishing activities in areas adjacent to nesting sites in at least six countries in Southeast Asia and the Western Pacific – Indonesia, Papua New Guinea, Solomon Islands, Vanuatu, Vietnam and Malaysia should be properly described and fishery threats identified in future research.

The working group captured the current state of knowledge in a table, which is presented in Appendix 3. This is intended as a guiding document and an important next step is to increase research efforts to develop an action plan, along the lines of that developed for the protection of Western Pacific nesting beaches. The working group discussed how fishery-related threats could be alleviated without negatively impacting the lives and incomes of fishers, including modifying fishing hooks and nets, training fishers in safely releasing trapped turtles, spatial or temporal fishery closures, fishery buy-outs and alternative employment and incomes. It was also highlighted that different scales of climate change that affect temperature and other facets of the environment could potentially impact foraging and migration of turtles. Over the long-term, sea level rise could also affect nesting sites. Recent experience in the Eastern Pacific shows positive outcomes from cooperation between fishers and conservationists.

The working group also suggested that interventions developed should match local conditions and laws or regulatory regimes and at the same time need to study and consider the potential impacts on the livelihood of low income fishers. The following key action priorities were identified:

- 1) Research – See Appendix 3 for research priorities related to fisheries impacts on nesting areas, internesting areas, migratory pathways to and from nesting sites and

foraging areas for five countries (Solomon Islands, Vanuatu, Papua New Guinea, Indonesia and Malaysia).

2) Priority fishery activities at sites:

- a. undertake mitigation measures (e.g. gear modifications: promotion of turtle excluder devices (TEDs), circle hooks);
- b. initiate observer programs;
- c. distribute turtle handling equipment (e.g. line cutters); and
- d. conduct workshops for trainers and fishers.

3) Capacity building for the region towards promoting consistent coastal data across the region and at the same time strengthening knowledge in:

- a. statistics;
- b. database management; and
- c. fishing gear technology.

4) Dissemination of information:

- a. assemble relevant information in a website linked to an institution to enhance ownership (e.g. Ecopacifico).

5) Social network analysis in terms of:

- a. understanding fisher network to facilitate information collection and appreciation of decision-making processes (i.e. understanding fishers' thinking and how to communicate with them) .

6) Promote compliance and strengthen enforcement.

7) Map fisheries near nesting sites to provide a better understanding of the situation on the ground for the development and implementation of:

- a. self-enforcing solutions and
- b. incentives, participation, comanagement, traditional systems, compensatory instruments for conservation.

Action 3: Support Existing Regional Conservation Schemes

Saving Pacific leatherback turtles requires a better understanding of the complex factors that create the current extinction risks. Leatherbacks are probably the most highly migratory of marine creatures, putting to shame even the sojourns of tunas and billfish. A nesting turtle may deposit its eggs in equatorial Papuan Indonesia, swim all the way to the temperate waters of the North Pacific to forage off the Californian coast, return to Papua to nest several years later and then either make a return migration to California or wander elsewhere to the South China Sea off Malaysia. In doing so, a leatherback passes through the convention area of two Pacific tuna fishery management conventions (IATTC, WCPFC) and several other smaller sub-regional associations concerned with fisheries science and management (SEAFDEC, FFA, SPC-OFP). It also passes through the geographical competences of three regional conservation instruments or organizations (IOSEA, IAC and SPREP). Further, because of their terrestrial nesting habitat and aquatic life-history, turtles are often the dual responsibility of several national government departments dealing with fisheries, environment and conservation, forestry, and national parks. In the Pacific, this complex geo-political mosaic of national, sub-regional and regional entities can impede effective turtle conservation because of uncertainty about which organizations

should lead the turtle conservation programs. This highlights the national and international partnerships which are necessary to facilitate an effective conservation strategy.

As a consequence, initiatives like the Bellagio and Terengganu workshops provide a forum and mechanism to develop a comprehensive conservation program, which seeks not only to identify threats, but also to develop strategies for what needs to be done to counter these threats and plans for sourcing funds to support long-term effective conservation. Since the first Bellagio meeting in 2003, many countries have started testing mitigation measures expected to reduce leatherback interactions and mortality in high seas pelagic longline fisheries, and some have adopted the use of better gear and handling procedures to release turtles with minimum harm. Over the same period, longline and other fishery observer programs have improved, as has reporting of accidental turtle catches. Despite these advances, gaps still remain in our knowledge and, more importantly, in the global implementation of these methods. Focusing on the Western Pacific, the Terengganu workshop discussed programs developed through fisheries management and research agencies, such as the WPRFMC, NMFS, SEAFDEC and WCPFC. They also noted that active programs have been initiated by national governments, such as the turtle breeding and conservation efforts by Malaysia, and by intergovernmental agencies such as the Convention on Migratory Species and SPREP.

Several programs in Indonesia, Papua New Guinea and Solomon Islands are jointly supported by governments and international and local non-government agencies, such as Conservation International (CI), World Wildlife Fund (WWF) and The Nature Conservancy (TNC). These three countries recently signed a Memorandum of Understanding on leatherback conservation. The action plan developed through this workshop will support such existing regional conservation schemes, for

example, the BSSE Tri-National Partnership between Papua New Guinea, Solomon Islands and Indonesia; the SSME involving Malaysia, the Philippines and Indonesia; and the SPREP. Information about these initiatives is contained in Appendix 4. Workshop participants also discussed fostering and strengthening exchange programs involving researchers and others, community-based initiatives, sharing of educational materials, convening annual working group meetings to review performances and coordinate conservation strategies.

Action 4: Secure Innovative Financing to Implement Priority Actions

Conservation and recovery of Pacific leatherbacks requires coordinated efforts on a number of fronts. Some threats can be addressed through immediate and short-term actions (e.g. short-term research projects, publicity campaigns of finite duration, and new regulations). Others will require making sustained conservation efforts over many years. For example, addressing threats on nesting beaches requires sustained efforts in the form of beach monitoring, nest relocation, enforcement, and in some cases providing community benefits in exchange for conservation. Currently, most Western Pacific nesting beach projects are dependent on minimal short-term funding that must be raised each year and is vulnerable to budget shortfalls of funding agencies. Some critical nesting beaches do not currently have funding for conservation efforts. Some projects have enough funding to collect data, but lack the funds to undertake necessary actions such as nest relocation, or providing incentives to communities to protect nests. This funding uncertainty makes it difficult for stakeholders to engage in long-term planning. In addition, there is a significant risk that conservation investments made in some years will be lost in others when funding is low. In some cases, years of conservation efforts may be undermined if the lack of funds means that actions cannot be

taken to deal with overarching issues such as sand temperatures that are too high (as a result of habitat degradation) or communities that have lost interest in conservation.

The conservation finance working group recommended the establishment of a fund for the Pacific leatherback. The long-term success of the conservation actions outlined in this report relies on steady financial support over time, to provide continuity to conservation activities and finance recurrent costs. A conservation fund ensures that, with legal protections, financial assets are set aside for specific purposes, and made available according to pre-determined criteria. The purpose would be to provide a fund mechanism that fully and sustainably supports the existing and future efforts to reverse the trajectory towards extinction of the Pacific leatherback. It was suggested that the four *Bellagio Blueprint* themes serve as the limiting focus for the fund. The fund will focus on the priority conservation actions and workplans developed by the workshop. It was recognized that initial highly cost-effective opportunities are apparent in the Western Pacific, thus fundraising efforts will begin with an initial emphasis on Western Pacific nesting beaches (Gjertsen 2008). The fund will be designed to attract support from governments, foundations, corporations and the public. Grants will be made for focused priority conservation actions as described above, on expert advice, and the fund's performance will be objectively evaluated.

Working group participants recommended that a business plan be developed to guide the establishment of a Pacific leatherback conservation fund. This document will assess the needs and costs of implementing a conservation action plan, and consider design

options for the fund, including the role of a board of directors and advisory committee in proposal review. A business plan outline was drafted by the working group as a basis for discussion, and is contained in Appendix 5, along with a background document describing conservation fund options. Based on the critical conservation needs and their estimated costs, the Terengganu workshop began to develop a Pacific leatherback fundraising strategy called 'Come Back Leatherback'. Preliminary estimates indicate that the costs of saving the leatherback are modest relative to the long-term value of this charismatic and iconic species. The fund will likely include a partial endowment and the complete assessment and estimates will be refined in the business plan.

A fund administrator will be selected to manage the fund. The fund administrator will be responsible for financial management, fund management, and grant making (both solicited proposals and targeted funding), reporting to a board of directors and advisory committee². Participants noted that fundraising should be a primary responsibility of the fund administrator. Participants also stressed the need for coordinating fundraising effort (such as by CI, WWF, U.S. Fish and Wildlife Service (FWS) Sea Turtle Fund and U.S. National Fish and Wildlife Foundation (NFWF) International Sea Turtle Fund) and to focus not only on US sources but to look for matching commitments (financial and in-kind) from host countries for Pacific leatherback habitats. The business plan will assess these topics in detail and will develop a complete revenue model and fundraising plan, and recommend the appropriate governance structure and mechanism (type of fund). There was great enthusiasm and support for establishing a fund and a full business plan was finalized in February 2008.

² Appendix 5 presents more detailed information about the structure of a fund and various design options.

Next Steps

To sustain the momentum generated by the Terengganu workshop, participants agreed to undertake the following activities:

1. The Steering Committee (involving additional resources, as needed) will prepare a Business Plan. The Business Plan was submitted in December 2007 and finalized in February 2008.
2. The Steering Committee will implement the Business Plan by selecting a fund administrator. All parties will work together to raise the funds for the new scale of action needed.
3. All participants will continue to upgrade networking and coordination, including existing and new networks. This may involve reactivating and reconfiguring annual leatherback meetings.
4. Participants suggested that Eastern Pacific leatherback working groups should initiate a similar process of business planning for the Eastern Pacific.
5. All organizations will prioritize and make long-term investments in building local capacity and directing funds to local actors.

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Appendices



Group photo with Mr. Leatherback



Executive Director of Western Pacific Regional Fishery Management Council, Ms. Kitty Simonds presenting a token of appreciation to the Chairman of the Terengganu State Health, Consumer Affairs and Environmental Committee, QB Toh Chin Yaw



Interactions during the Ma'Daerah Turtle Sanctuary Talk



Appendix 1: Welcome Speech

Ms. Kitty Simonds, Executive Director,
Western Pacific Regional Fishery Management Council

Aloha Kakahiaka:

On behalf of the organizers of this meeting, *the Bellagio Sea Turtle Conservation Initiative*, I would like to thank you for taking the time to come to Malaysia to focus on the conservation of endangered leatherback turtles. The Western Pacific Regional Fishery Management Council is happy to be able to support this meeting to bring concerned conservationists, scientists and resource managers to this forum. As a fishery manager, the Western Pacific Council views sea turtle conservation and recovery as a keystone activity for two reasons. First, our region's livelihood, and the future of pelagic fisheries, depends on the survival of turtles. Second, as Pacific Islanders, turtles are part of our cultural heritage and folklore. There is a curious irony to convening the meeting in Terengganu, once the site of one of the largest leatherback nesting populations, which despite conservation activities, has all but disappeared.

Fortunately, it is not too late for Western Pacific leatherbacks. We have the opportunity at this meeting to develop the plan to prioritize and guide the long-term sustainable management of the remaining population in this region

The first meeting, convened in Bellagio Italy in November 2003, identified what was needed to conserve the species from extinction. Today we are gathered together to identify how best to proceed to operationalize the Blueprint that was developed in 2003 and move the process forward. Given that secure financing is critical for sea turtle conservation activities, our goal is to develop a long-term funding strategy to provide continuity and thereby ensure the long-term success of our actions.

Nesting beach conservation is one of the most important activities that can be undertaken to conserve and recover depleted turtle populations. We know this from the successes we've seen throughout the world in places where nesting beach conservation has been a critical component of the conservation strategy, such as in St. Croix, Tortuguero, Brazil, Sabah, and in our own islands of Hawaii. There are many important lessons to be learned from the recovery of our Hawaiian green turtle where we reversed nesting beach impacts while reducing direct harvest in the foraging grounds during the mid 1970s. Today we have a healthy and recovering population; in fact we have so many green turtles that they compete with tourists and surfers for space along our shores!

Conservation and recovery do not take place immediately. Successful conservation requires long-term commitments by local communities as well as dedication by government, managers and scientists; much of which is dependent upon adequate financial resources. Despite the commitments that people have made to the recovery of leatherback turtles, economic considerations are likely to persist as the driving factor behind local decisions for participation in recovery efforts. Clearly, conditions in Hawaii are not comparable to the local issues and challenges faced in Indonesia, Papua New Guinea, the Solomon Islands and Vanuatu. Although some important and valuable steps have been undertaken towards the conservation and management of leatherback turtles in the western Pacific, without guaranteed long-term funding, we face the very real prospect of losing this initial positive momentum.

To date, funding has been ephemeral, dependent largely on US Congressional appropriations or donations from other sources secured by non-governmental organizations. This landmark meeting is the first of its kind where an internationally diverse group will develop a consensus on how to proceed to ensure the financial security for our conservation programs. The survival and ultimate recovery of leatherback turtles is dependent upon our success and creative vision.

“O Ho’okaha Ke Kai I Kai Ka’aina, O Ho’ohua Ka Ohana O Kolo”

The sea creeps up to land producing the family of crawlers (Kumulipo – Hawaiian Creation Chant)

Thank you and Mahalo nui loa,

Ms. Kitty Simonds

Executive Director,

Western Pacific Regional Fishery Management Council

Appendix 2: Nesting Beach Working Group: Action Plan

Recent studies show that the Western Pacific leatherbacks consist of a metapopulation comprised of scattered small aggregations nesting on the islands and areas throughout the region, with a dense focal point on the northwest coast of Papua, Indonesia (Dutton et al. 2007). Populations in the Pacific have collapsed, and while there are still relatively large numbers of leatherbacks nesting on the Birdshead Peninsula of Papua, there is great concern that without immediate action to ensure effective nesting beach conservation, this population will also disappear. There are opportunities to immediately enact conservation measures through community-based initiatives on the nesting beaches to dramatically increase hatchling production before these populations collapse. This is a priority that has been highlighted in a recent regional Action Plan for leatherbacks in the Pacific (Steering Committee, Bellagio Conference on Sea Turtles 2004), as well as in other regional fora such as the Indian Ocean and South-East Asia Memorandum of Understanding (IOSEA-MoU), and the BSSE Tri-National Agreement between Indonesia, Papua New Guinea (PNG), and Solomon Islands to coordinate conservation of leatherbacks. Other threats, such as traditional take of adults and juveniles on foraging areas in the Kei Islands (Suarez and Starbird 1996) and incidental capture on high-seas and coastal fisheries, are also of concern and need to be addressed as part of a broad suite of measures in order to achieve population recovery in the long-run (Dutton and Squires, in press). This Action Plan represents a cohesive regional effort to address the immediate and long-term conservation activities focused on nesting beaches. The Plan is designed and implemented by a network of government agencies, international and local NGOs, academic institutions and village communities.

This Plan describes nesting beach activities and management needs in I) Papua, Indonesia; II) Papua New Guinea; III) the Solomon Islands; IV) Vanuatu; V) Malaysia; and VI) Vietnam.

Information on the background and current situation of each country is provided, as well as a list of issues to be addressed, which includes:

- a description of each issue;
- current actions;
- future actions required; and
- performance metrics.

I. INDONESIA

- 1) Papua: Jamursba-Medi and Wermon Papua
- 2) Alas Purwo-East Java and Bali

Background and current situation

A. Papua

Despite the dramatic decline in Pacific leatherback populations in the past few decades (Spotila et al. 2000), and the loss in nesting numbers on beaches in the eastern Pacific and in Malaysia (Chan and Liew 1996; Sarti et al. 2007), the Jamursba-Medi and Wermon beaches in Papua, Indonesia, remain one of the last major and promising nesting beaches for leatherbacks in the Pacific (Hitipeuw and Maturbongs 2002; Sukanuma 2006; Hitipeuw et al. 2007; Dutton et al. 2007). Jamursba-Medi Beach spans 18 km of coastline and includes 3 beaches: Warmamed, Batu Rumah, and Wembrak where peak nesting takes place between March and September. At the 6-km long Wermon Beach which lies approximately 30 km east of Jamursba-Medi, peak nesting occurs between October and March. In the 1980s, Bhaskar (1987) estimated 13,000 nests in a season in Jamursba-Medi; today, between 1,865–3,601 nests are recorded each season at Jamursba-Medi, and 1,788–2,881 nests at Wermon (Hitipeuw et al. 2007). Sukanuma (unpubl. data) recorded 1,360 nests at Jamursba-Medi and 1,014 nests at Wermon in 2006.

The authorities responsible for the management of the nesting beach include the local district government, the Nature Conservation Agency, and Department of Forestry (BKSDA II), but the beach monitoring is carried out by the NGOs: WWF-Indonesia and YAL (Yayasan Alam Lestari) through the employment of villagers from the communities on the beaches. Monitoring work in Papua has focused on the size of the nesting population, protection of females and nests, and conservation efforts with local communities (Hitipeuw and Maturbongs 2002; Sukanuma 2006; Hitipeuw et al. 2007). However, discussions with the local communities and recent research have suggested chronically low hatchling production especially on Jamursba-Medi. Tapilatu and Tiwari (2007) found that mean hatching success in nests undisturbed by pig predation was 9.3 percent at Wembrak, 44.7 percent at Batu Rumah, and 31.4 percent at Warmamed. The overall mean hatching success was significantly lower in Jamursba-Medi than in Wermon (Jamursba-Medi at 25.5 percent, Wermon at 47.1 percent). Sukanuma (unpubl. data) found that mean emergence success was 11.5 percent at Wembrak, 34.0 percent at Batu Rumah, and 41.6 percent at Warmamed in 2006 with an overall mean emergence success of 35.2 percent. Emergence success was found to vary among months within a season with 41.8 percent (n=101) recorded in June 2006 and 3.4 percent (n=22) recorded in September 2006. Tapilatu and Tiwari (2007) determined that any management plan developed for Papua will need to address the impacts of predation, inundation and beach erosion. Studies on the impact of sand temperatures on embryo mortality and a spatial and temporal evaluation of erosion and nest loss are also much needed to develop a good management strategy. Given the observed decline in Pacific leatherbacks, the importance of the Papuan nesting population is magnified and wise management strategies need to be devised and refined to maximize hatchling input into the Papuan leatherback population. The goal highlighted for nesting beaches in the Bellagio Blueprint (2004) is to maximize nest protection and optimize hatchling production to recover depleted populations.

The lack of consistent funding, commitment, and presence on the beach has led to piecemeal efforts, poor coordination, and duplication by different groups, which have exacerbated local tensions. Recently, however, a stakeholders' meeting was organized to address issues and establish cooperation and collaboration at local and federal levels. Efforts are also underway to coordinate and standardize the conservation and monitoring work. There is a need to establish an advisory committee and to encourage the management authorities to become actively engaged in the oversight of the nesting beach program.

B. Alas Purwo-East Java and Bali

Outside Papua, low and scattered nesting by leatherbacks on a number of beaches have made conservation challenges even greater. Though the number of nesters is not significant, strategic conservation efforts at these beaches would enhance the conservation commitments at the national level and in local communities, and even leverage lessons learned of the conservation success. These beaches lie in the Western tip of the Western Pacific area at two locations, Alas Purwo-East Java and Bali, where 1-14 nesters are found nesting per annum. Alas Purwo is already a National Park and important for leatherback nesting in Indonesia. In 2006, the National Park Authority reported that there were about 14 leatherback nests found and saved on the beaches. The major threats on this beach are predation by monitor lizards, poachers and unsuitable nesting areas because of logs on the beach. Limited scientific surveys and information are available from this nesting beach. There are three beaches in Bali (Lepang-Klungkung, Canggu and Perancak beaches) where leatherbacks have been found nesting in previous years. The number of nesters was 1-3 nesters per annum. The current effort to save nests and nesters was based on the initiative of the local community with support from NGOs and government and media, and also private sectors. However, if the eggs are found by people who are not pro-conservation, the eggs end up in the market. There is a need to mobilize the communities, tourists and private sectors to conduct awareness campaigns, promote a partnership for turtle conservation, and boost turtle conservation in the country through the media and tourist events.

Issues to be addressed

The issues to be addressed include the following (issues 1-4 are focussed on Papua):

- 1) Low hatching success where the negative impacts of the following identified factors need to be reduced: a) predation, b) inundation and erosion, and c) elevated sand temperatures.
- 2) Standardized methods for reliable monitoring.
- 3) Exploitation of females and eggs/safeguarding of nesting habitat.
- 4) Establishment and enforcement of marine protected areas.
- 5) Need for non-index beach surveys.

1a. Predation

Description

The main predators observed on the nesting beach are pigs, dogs, and monitor lizards. In Jamursba-Medi, predation by feral and domestic pigs appears to occur extensively, but almost exclusively in Warmamedia with 29.3 percent of the nests depredated between June and July 2005 (Tapilatu and Tiwari 2007). Dog predation is also relatively extensive especially when leatherback nests are hatching, but monitor lizard predation is less common. In Wermon, predation by feral pigs and dogs accounted for 17.5 percent of nest loss during 2003–04 (Hitipeuw et al. 2007). Between November 2004 and September 2005, monitor lizards were responsible for depredating 0.5 percent of the nests in Wermon (Wurlianty and Hitipeuw 2006). Sukanuma (unpubl. data) estimated that pigs, dogs and monitor lizards destroyed 13.3 percent of the nests at Jamursba-Medi and 11.8 percent at Wermon on August 2006. Overall, damage by pigs is of greatest concern and needs to be addressed.

Current actions

- In Jamursba-Medi, domestic pigs have been removed from the beach and an electric fence and traditional pig traps and fences are being installed along the vegetation line to deter feral pigs. As the local people hunt pigs for consumption, pig traps on the beach will greatly benefit and provide additional income to those community members participating in the pig trap project.
- Dogs have been removed from the nesting beach as far as possible.
- In Wermon, during the 2006-2007 season, local patrollers were introduced to the concept of bamboo grids over nests for protection.

Future actions required

- Continual maintenance of the electric fence and pig trap system including ensuring that no endemic species are affected.
- Effective control of domestic pigs and dogs behind the beach (e.g. corals), for patrollers who need their animals while at the nesting beach, so that access to the beach is prevented.
- Installation of bamboo or plastic grids over a larger/logistically feasible percentage of nests in the more dense sections of beach.

Performance metrics

- Regular data collection on number of nests depredated each season after management procedures have been installed.
- Continual evaluation of methodologies implemented to deter predation.

1b. Inundation and erosion

Description

The beach at Jamursba-Medi is very dynamic and extensive seasonal erosion and accretion occurs. Just following the peak nesting period, the beach begins to erode as the monsoons set in from August to October (and sometimes as early as July) and a large number of incubating nests are washed away. At Warmamed, 80 percent of randomly marked nests were lost prior to hatching. Short stretches, 5–10 m in width, remain while other sections of beach are completely eroded (Hitipeuw et al. 2007); accretion occurs by April, when the nesting season begins. Hitipeuw et al. (2007) estimated that at least 45 percent of the nests are being lost to erosion. Additionally, high tides wash over many nests. During the 2005 season in Jamursba-Medi, high tides in July washed over 31.5 percent ($n = 17$) of the nests in Wembrak and around 15.2 percent ($n = 15$) of the nests in Warmamed. Sukanuma (unpubl. data) estimated that 48.3 percent ($n = 60$) of the nests at Wembrak, 15.7 percent ($n = 70$) at Batu Rumah, and 67.1 percent ($n = 70$) at Warmamed were lost to erosion in 2005, with an overall mean nest loss to erosion of 43.5 percent. In 2006, the erosion rate was 40.1 percent ($n = 202$) at Wembrak, 18.0 percent ($n = 205$) at Batu Rumah and 11.3 percent ($n = 389$) at Warmamed with the overall erosion rate at Jamursba-Medi decreasing to 20.4 percent, indicating variation in nest loss among seasons (Sukanuma unpubl. data). In Wermon, Sukanuma (unpubl. data) estimated that 48.4 percent ($n = 186$) of the nests were lost to erosion at Wermon in June 2006 and 17.1 percent ($n = 82$) in September 2006.

In 2005, the mean percentage of dead embryos (stages 29–31) found in the nests was 6.7 percent ($n = 31$) at Wembrak, 5.4 percent ($n = 59$) at Batu Rumah and 10.3 percent ($n = 23$) at Warmamed and 12.0 percent ($n = 51$) at Wermon. The mean percentage of dead embryos (stages 29–31) estimated in 2006 was 6.1 percent ($n = 28$) at Wembrak, 16.4 percent ($n = 61$) at Batu Rumah and 19.2 percent ($n = 119$) at Warmamed (Sukanuma unpubl. data); in Wermon it was 16.1 percent ($n = 101$) in June 2006 and 4.0 percent in September 2006. Sukanuma (pers. comm.) suggested that high tide wash and inundation may be responsible for these dead embryos, as infertile or unobserved embryos range around 5–15 percent in natural nests.

Erosion is less pronounced in Wermon, but nests are commonly washed over by high tides during the monsoons. Approximately 9 percent of the nests laid in experimental plots were washed away by high tides during the 2006 season (Tapilatu and Tiwari 2007). In 2003–2004, 10.7 percent of the observed nests were placed below the high water mark (Hitipeuw et al. 2007).

Current actions

- Studies are underway to quantify the number of nests inundated and/or lost to erosion.

Future actions required

- Relocation of vulnerable nests to more stable sections of the beach.
- Continued evaluation of the spatial and temporal variation in erosion to determine percentage of “doomed” nests each season.
- Training local patrollers to relocate nests.

Performance metrics

- Evaluation of hatching success in relocated nests.
- Evaluation of the percentage of nests relocated each season.

1c. Elevated sand temperature

Description

At Jamursba-Medi, sand temperatures fluctuated between 28.6 and 34.9°C during the 2005 nesting season (Tapilatu and Tiwari 2007) with the highest average temperatures recorded in Wembrak and lowest in Warmamed, which reflects the variation in sand color, i.e. white/light gray sand on Warmamed and dark gray/black sand on Wembrak. In Wermon, observed sand temperatures fluctuated between 27.0 and 32.7°C and were lower than Jamursba-Medi temperatures. Despite having black sand, Wermon sand temperatures are probably lower because the nesting season coincides with the monsoons. The thermal tolerance range for sea turtle embryos is estimated to lie between 25 and 35°C (Ackerman 1997) or between 24 and 32°C (Yntema and Mrosovsky 1982), and the pivotal temperatures tend to cluster around 29°C (Mrosovsky 1994). High sand temperatures at Jamursba-Medi, especially in Wembrak, may potentially be exceeding the thermal tolerance of these leatherback embryos resulting in the high embryo mortality observed in clutches. Extensive work on the effect of sand temperatures is much needed.

Current actions

- Relocation of some nests to shaded hatcheries. Results of a preliminary hatchery experiment on Warmamed in 2006 indicate that in a shaded hatchery mean hatching success can be increased considerably to 70.5 percent (sd = 30.8, range = 0 – 96.4, n = 15; Tapilatu and Tiwari unpubl. data). During the 2006-2007 nesting season, hatching success in the Wermon hatchery was 48 percent lower than the hatching success in the Warmamed hatchery.

Future actions required

- Construction of more hatcheries for nest relocation.
- Nest relocation to a cooler and more stable beach zone where sand temperature is monitored daily.
- Continued monitoring of sand temperature along different sections of beach to determine variation in temperature along the beach and among seasons.
- In-depth studies on: a) the relationship between sand temperature and stage of mortality during development; b) thermal tolerance of leatherback embryos in Papua; and c) pivotal temperature and sex ratios.

Performance metrics

- Evaluation of hatching success *in-situ* and in relocated nests.
- Evaluation of sand temperature *in-situ* and in relocated nests.
- Evaluation of sex-ratios *in-situ* and in relocated nests.

2. Standardized and reliable monitoring***Description***

Local villagers are currently hired to: 1) count nests laid the previous night and record the number of depredated or inundated nests on daily morning patrols; 2) evaluate hatching success; and 3) measure and tag nesting females on night patrols.

Current actions

- Irregular morning and night patrols.
- Partial verification of data collected by the patrollers.
- Attempts to coordinate data collection between the two organizations working on the beach.
- Development of a standardized monitoring protocol underway.
- Hiring of a data manager.
- Studies underway to evaluate and quantify *in-situ* hatching success.

Future actions required

- Appropriate allocation of duties to each patroller in consultation with them.
- Hiring of a station manager to oversee the monitoring program.
- Implementation of a standardized monitoring protocol by all organizations working on the beach.
- Coordinated data collection and collaboration among organizations.
- Discussion of research and monitoring activities by partners at the start of each nesting season.
- Establishment of an advisory committee to review research proposals and make recommendations to the local Management Authority.

- Implementation of the Action Plan developed by the Tri-National Memorandum of Understanding among Indonesia, Solomon Islands, and Papua New Guinea to support field conservation efforts and establish effective institutional and funding mechanisms to implement management activities in a sustainable manner.

Performance metrics

- Regular verification and reporting of data.
- Regular evaluation of patrollers' performance.
- Regular evaluation of the program and research conducted by the different partners.

3. *Exploitation of females and eggs/safeguarding of nesting habitats*

Description

In the past, extensive exploitation of eggs has been recorded at Jamursba-Medi, but not of females because they are considered sacred (Hitipeuw et al. 2007). Currently, conservation activities appear to have minimized this threat on the index-beaches, although occasional egg collection is reported. Eggs from 40.8 percent of the nests were collected by local people at Wermon in 2004 (Suganuma unpubl. data). Fishermen from Biak occasionally come to harvest females at Jamursba-Medi and Wermon (Suganuma pers. comm.). Consumption of females and their eggs by the local people has occurred at Asokueri beach of Kabare village and Warebar beach of Yembekaki village on north Waigeo Island; some females fitted with transmitters in Jamursba-Medi have visited those beaches (Suganuma pers. comm.). Extensive exploitation of eggs and females occurs outside the index areas. In the Muhrani-Kaironi area most nests appear to be collected for consumption; it is estimated that at least 300 nests are taken annually (Suganuma unpubl. data).

Potential use of the nesting beach for log ponds and expansion of logging trails (roads) by forest concession companies is an economic opportunity for local people and landowners. Additionally, timber resources located at the hinterland lowland forest and non-timber product development (forest clearance) may create other economic opportunities. However, protection measures and incentives need to be implemented to maintain healthy nesting habitats.

Current actions

- Employment of local villagers as patrollers in the nesting beach program.
- Research and protection on some of the non-index beaches.
- 3-year scholarships for 12 local junior and high school students in exchange for the villagers' declaration of a protected area.

Future actions required

- Education and outreach programs.

- Addressing community needs, including education and health care support and developing economic incentives for conservation.
- Increasing the sense of responsibility in the villagers for their turtles and resources.
- In-depth evaluation of nesting and exploitation of eggs and females at non-index beaches.

Performance metrics

- Regular evaluation of number of females and nests exploited every nesting season on index and non-index beaches.
- Regular review of the villagers' involvement in the conservation of their turtles and resources.

4. Marine protected area

Description

In July 2005, a multi-stakeholder workshop generated commitment from the local government to designate an area of 169,000 ha as the District Marine Protected Area (MPA). This MPA will include beaches, hinterland forest, and surrounding waters.

Current actions

- District decree in place.
- National decree underway.

Future actions required

- Development of management plans for the newly established district MPA.
- Law enforcement activities.
- Establishment of a capable management unit.

Performance metrics

- Regular evaluation of law enforcement and management plans.

5. Non-index beach surveys

Description

Only the index beaches of Jamursba-Medi and Wermon are monitored each year. However, surveys were carried out on foot in the Muhrani-Kaironi area in September 2006 and in June 2007 where most nests are taken for consumption and the nesting season is the same as Wermon (Suganuma pers. comm.). Approximately 16 nests were found in September 1999 in the Wewe-Kwor region. Logistical issues have prevented regular evaluation of nesting at other beaches in Papua.

In Alas Purwo and Bali, the current effort to save nests and nesters was based on the initiative of the local community with support from NGOs, government, media, and also private sectors. However, if the eggs are not found by individuals who are pro-conservation, the eggs end up in the market.

Current actions

- Occasional aerial surveys.
- Research and protection on some non-index beaches.

Future actions required

- Foot surveys of the Sidei-Wibain area.
- Establishment of a monitoring program in the Manokwari region, Mubrani-Kaironi area, and the Sidei-Wibain area.
- At least one survey, on foot or aerially, at or just after the peak of the nesting season to obtain an estimate of nesting activity.
- Education and awareness campaigns to boost leatherback conservation.

Performance metrics

- Use nest counts to determine the importance of as well as the spatial and temporal variability in nesting at these beaches.

II. PAPUA NEW GUINEA

Background and current situation

Nesting in Papua New Guinea (PNG) takes place primarily on the beaches of the Huon Coast in the Morobe Province, accounting for 50 percent of all nesting activity, with the majority of nesting located on beaches within the Kamiali Wildlife Management Area (KWMA). Nesting also occurs on Bougainville, the south coast of the West New Britain Province and the north coast of the Madang Province (Benson et al. 2007).

Currently, the only ongoing project is the Huon Coast Leatherback Turtle Conservation Project (HCLTCP), which includes the communities, from north to south along the Huon Coast: Labu Tale, Busama, Salus, Lababia (Kamiali), Paiawa, Sapa and Kobo. Anecdotal information from Huon Coast villagers and nesting beach surveys undertaken in the 1980s (Hirth et al. 1993; Quinn et al. 1983; Quinn and Kojis 1985; Bedding and Lockhart 1989) suggest a decline in leatherback nesting females over the past 20-30 years (Benson et al. 2007; Pilcher 2006). The HCLTCP is supported by the Marine Research Foundation (MRF) and through partnerships with the Department of Environment and Conservation (DEC) and a local NGO, the Village Development Trust. Funding is provided by the Western Pacific Regional Fishery Management Council (WPRFMC).

Significant nest-loss occurs through beach erosion and wave inundation (up to 100 percent in some locations on the Huon Coast), egg collection (outside of the Huon coast project areas), harvesting and/or killing of adult turtles at some locations, and predation, mostly by dogs (previous estimates at Lababia suggested that up to 80 percent of unprotected nest were being taken by dogs).

Future management actions to maximise hatchling production and reduce killing of adults in PNG will need to include relocation of nests that face beach erosion or inundation, expansion of nest protection measures (including the protection of nests and nesting females), and an increase in education and outreach initiatives (including the promotion of existing legislation under the 1976 Fauna Protection and Control Act, which includes protection of leatherback turtles).

Achieving recovery and conservation of leatherbacks in PNG is also dependent upon understanding the social and cultural dynamics, tenureship arrangements and leadership structures of communities which have leatherback turtles nesting within their territorial domains. For the monitoring and recovery program along the Huon Coast it has also been important to gain an understanding of both the historical and current program dynamics that have occurred/occur between the local communities engaged to carry out monitoring and recovery activities, funding agencies, visiting scientists, and a myriad of implementing agencies. Care must also be exercised to ensure that expectations amongst community implementers are not raised to unrealistic levels in regards to monetary or other benefits.

Issues to be addressed

The issues to be addressed include:

- 1) Low hatching success and population recruitment including: a) predation; and b) inundation and erosion.

- 2) Standardized methods for reliable monitoring and conservation.
- 3) Exploitation of females and eggs.
- 4) Need for non-index beach surveys and conservation.

1a. Predation

Description

Levels of predation of leatherback turtle nests are unknown at present for all of PNG.

Anecdotal reports from the Huon Coast suggest that predation by feral and domestic dogs is a major problem when hatchlings are emerging, with an estimated 80 percent of nests being lost at Lababia in the 2005-2006 nesting season (Pilcher 2006). Crocodiles have also been documented to occasionally kill leatherback turtles as they emerge to nest (Rei 2005; Hirth et al. 1993; Quinn et al. 1983).

Current actions

- Along the Huon Coast, the construction and placement of bamboo grids has been utilised for village and feral dog predation.

Future actions required

- An assessment of predation in other leatherback turtle nesting areas across PNG.
- Education and awareness conducted in other communities outside of the Huon Coast (conducted in conjunction with the above assessment).
- Promotion of the implementation of bamboo grids across a wider spatial range.
- Assessment of the conservation benefits of bamboo grids in the Huon Coast.

Performance metrics

- Data collection on number of nests depredated each season after management procedures have been installed.
- Continual evaluation of methodologies implemented to deter predation.
- Percentage of reduction in, or elimination of predation.

1b. Inundation and erosion

Description

Levels of inundation and erosion of leatherback turtle nests are unknown at present for all of PNG.

Along the Huon Coast, narrow nesting beaches are subject to seasonal or storm-related erosion and accretion cycles, resulting in nest loss. Rivers frequently breach at different times of the year at different sites and nests located close to the river bank and other natural drainage systems are exposed. Nests are also destroyed during high tides (Pritchard 1971; Quinn et al. 1983). During the 2004-05 nesting season, approximately 40 percent of nests at the Lababia were lost to erosion (Kisokau 2005). At Paiawa all nests (n = 28) laid were washed away during the 2005-06 season, and erosion has continued to be an issue. During a 25-km beach survey undertaken from 20-23 January 2006 from Labu Tale to Busama, many nests were observed to have been washed over in several locations, and considerable flotsam was observed covering nests, suggesting periodic inundation (Kinch 2006b).

Current actions

- The Huon Coast
 - Beach profiling exercises.
 - Quantification of the number of nests inundated and lost to erosion in the monitored area.
 - Global Positioning System (GPS) location of nests is recorded to assist with spatial distribution and beach profiling over time in the monitored zones.
 - Studies underway to quantify *in-situ* hatching emergence rates on monitored beaches.

Future actions required

- Estimation of beach erosion and nest inundation for leatherback turtle nesting areas in PNG this (could be subsumed in predation assessment of the above section).
- Training provided to community members on appropriate relocation of vulnerable nests to more stable sections of the beach, particularly on the Huon Coast this (could be subsumed under the education and awareness program in the section above).
- Evaluation of the spatial and temporal variation in erosion to determine the percentage of “doomed” nests each season along the Huon Coast.

Performance metrics

- Evaluation of hatching success in relocated vs. *in-situ* nests in the Huon Coast.
- Evaluation of the percentage of nests relocated each season in the Huon Coast.

2. Standardized methods for reliable monitoring and conservation

Description

There are no other monitoring activities in PNG outside the Huon Coast. Currently on the Huon Coast, community monitors patrol nightly during peak season from 1st October to 30th March to measure and tag nesting and to record nesting behaviour, clutch size and nest location; quantify the number of nests laid, and deploy bamboo grids for nest protection or relocate nests laid in erosion prone areas.

Current actions

- The Huon Coast
 - Saturation Passive Integrated Transponder (PIT) tagging.
 - Night and morning patrols.
 - Verification of data by team leaders and project manager.
 - Coordinated standardized data collection protocol within and among the participating communities.
 - Studies underway to quantify *in-situ* hatching success.

Future actions required

- Provision of training and capacity building for a local, permanent project manager and NGO to oversee and implement the HCLTCP.
- Standardized monitoring protocol implemented for monitoring communities in the Huon Coast and for possible future communities in wider-PNG where leatherback turtles nest.
- Sustainable management regime that includes relocation of “doomed” nests and implementation of beach management measures (bamboo grids, or other appropriate measures).
- Periodic aerial surveys.
- Support and implementation of the Action Plan developed by the Memorandum of Understanding (MOU) among Indonesia, Solomon Islands, and Papua New Guinea to support field conservation efforts and establish effective institutional and funding mechanisms to implement management activities in a sustainable manner.

Performance metrics

- Regular verification and reporting of data.
- Regular evaluation of staff performance and quality of data collection.

- Regular evaluation of community participation and buy-in in conservation activities.
- Regular evaluation of the program and research conducted by the different partners.

3. Exploitation of females and eggs

Description

Leatherback turtles have been consumed to some extent in different areas of Madang, Morobe, Manus, East Sepik, East New Britain, Milne Bay and Central Provinces (Pritchard 1979; Spring 1982a; 1982b; Lockhart 1989). In some areas, they were part of the subsistence diet or were utilized in extending social relationships through trade, but in general it appears that the consumption of leatherback turtles was not widely practiced because their oily flesh is considered unpalatable (Quinn et al, 1985; Pritchard 1979), although direct harvest does occur, as done incidental killings not for subsistence purposes. Leatherback turtle and egg take has not been assessed across PNG.

Along the Huon Coast, 26 leatherback turtles have been reported killed since 2001 (Kinch 2006a; Kinch pers. comm.; Krueger pers. comm.). In the past, leatherback turtles at Paiawa were regularly killed and smoked leatherback turtle meat was traded with mountain peoples residing in the interior for pig meat (Kinch 2006a). Egg harvesting was until recently still widely practiced along the Huon Coast, particularly in communities not involved in the monitoring program (e.g.: 20 nests laid at Labu Miti; 12 nests at Buansing; all nests laid at Maiama; and 10-15 nests out of 15-20 laid at Sapa). Monthly market surveys undertaken by the PNG Coastal Fisheries Management and Development Program (National Fisheries Authority 2006) and a recent HCLTCP/WWF survey of the Aigris Market (Kinch et al. 2007) confirm that no leatherback turtle eggs are being openly sold in Lae, though other turtle species are.

Current actions

a. The Huon Coast:

- Support by participating communities along the Huon Coast to be involved in an egg and turtle harvest moratorium.
- Employment of local villagers as HCLTCP beach monitors and team leaders.
- Community conservation incentives for participating communities along the Huon Coast.
- Socioeconomic assessments.
- Awareness of government legislation.
- Environmental education through comic books, handbooks, signboards, videos, community workshops, marine education curriculum and teachers' manual for the Huon Coast as well as HCLTCP Newsletters and HCLTCP participation at festivals.

b. PNG

- Awareness-raising in national newspapers by the Sea Turtle Restoration Project.

Future actions required

- Evaluation of nesting status and exploitation of eggs and females at monitored and non-index beaches throughout PNG.
- Improvement of the community incentives scheme along the Huon Coast.
- Provision of training for communities on management and conflict resolution for communities along the Huon Coast (in regards to the utilisation of the community incentive scheme).
- Networking with Bris Kanda Inc. (on village development issues) and other relevant organizations or NGOs such as MAREMCO (regarding marine resource management issues) for the Huon Coast.
- Engagement of an education/communications specialist to develop and maintain an education and awareness program for communities along the Huon Coast (and the wider PNG), government agencies, NGOs and other relevant stakeholders throughout PNG.
- Exploration of relationships with church, women's and youth groups as these can provide a potent and innovative vehicle for approaching leatherback turtle recovery.

Performance metrics

- Evaluation of number of females and nests exploited every nesting season on index and non-index beaches.
- Regular and independent review of the villagers' involvement in the conservation of their turtles and resources.

4. Non-index beach surveys***Description***

Leatherback turtle nesting in PNG occurs along the Huon Coast of the Morobe Province, Bougainville, the south coast of the West New Britain Province and the north coast of the Madang Province, with occasional nesting reported from the Milne Bay, Manus and the New Ireland Provinces (Spring 1982a; Benson et al. 2007).

Along the Huon Coast, the beach under Lababia territorial domain is the primary 'index' site in PNG. However, other locations such as Labu Tale and Busama are equally important due to the comparative value of these sites with historical research and monitoring activities (e.g. Hirth et al. 1993, Quinn et al. 1983; Quinn and Kojis 1985; Bedding and Lockhart 1989).

Current actions

- Annual aerial surveys.

Future actions required

- Evaluation of nesting beaches and quantification of threats from exploitation of eggs and females, predation, and environmental impacts throughout PNG.
- Beach survey by foot just after the peak of the nesting season to obtain an estimate of nesting activity.
- Expansion of education and awareness programs throughout PNG.
- Empowerment of communities for self-enforcement to protect their turtles and other natural resources.
- Continuation of aerial surveys.

Performance metrics

- Determine the relative proportion, as well as the spatial and temporal variability in nesting at these non-index beaches.

III. SOLOMON ISLANDS

Background and current situation

The Solomon Islands contain some of the key leatherback nesting sites remaining in the Western Pacific. Local consumption of turtles and eggs is believed to have drastically reduced nesting populations over the last few decades. However important nesting areas remain on Isabel Island at two principal beaches, Sasakolo and Litogarhira (Dutton et al. 2007), and some nesting still occurs on Rendova and Tetepare in the Western Province.

The authorities responsible for the management of the nesting beach include the Solomon Islands DEC in partnership with local landowner tribal communities of Sasakolo and Litogarhira on Isabel, and the Tetepare Descendant's Association, TNC, WWF and CI. Recently initiated monitoring work has focused essentially on the size of the nesting population, protection of females and nests, and conservation efforts with local communities through incentive agreements. A well-trained group of beach patrollers has been established at Sasakolo to monitor the entire beach and tag turtles. There are plans to expand this effort to the neighboring beach of Litogahira. Although harvest of eggs has ceased at Sasakolo, many nests are washed away by high tides, and nest relocation will be needed to increase hatchling production. Within the communities of Tetepare and Rendova there exists a well developed infrastructure for community-based conservation, with participants receiving financial incentives for protecting nests that can be documented to produce hatchlings.

Like other areas in the region, the lack of consistent funding, commitment, and presence on the beach has led to piecemeal efforts, lack of commitment, and exacerbated local tribal tensions and landowner disputes. Recently, however, the Solomon Islands Government and NGO partnership has established cooperation and collaboration among landowners and a commitment to establish the Sasakolo and Litogarhira Conservation Areas. Efforts are also underway to coordinate and standardize the conservation and monitoring work.

Issues to be addressed

The issues to be addressed include:

- 1) Low hatching success: inundation and erosion are the primary cause of nest loss, but there is a need to assess hatching success and the impacts of predation, illegal harvest and physical factors (e.g. sand temperatures).
- 2) Standardized methods for reliable monitoring.
- 3) Exploitation of females and eggs.
- 4) Establishment and enforcement of protected areas.
- 5) Need for non-index beach surveys.

1a. Predation

Description

The commonly known predators of turtle eggs, apart from humans, are iguana lizards, red nob hens, and domestic dogs.

Current actions

- Dogs have been removed from the nesting beach as much as possible.
- Mesh wires are used to protect nests from predators.

Future actions required

- An assessment of predation at leatherback turtle nesting beach at Litogahira
- Evaluation of bamboo grids to reduce predation
- Expansion of outreach and education to reduce impacts of dogs

Performance metrics

- Regular data collection on number of nests depredated each season after management procedures have been installed.
- Continual evaluation of methodologies implemented to deter predation.

1b. Inundation and erosion

Description

The beaches at Sasakolo and Litogarhira are very dynamic and extensive seasonal erosion and accretion occurs. Ephemeral nesting habitat forms in front of estuaries on certain sections of the beaches and these wash away during periods of heavy rainfall, destroying incubating nests. In addition, other sections are very narrow and nests laid below or near the high tide level are washed away. About 90 percent of the nests are washed away by high tides.

Current actions

- Studies are underway to quantify the number of nests inundated and lost to erosion.

Future actions required

- Relocation of vulnerable nests to more stable sections of the beach.
- Continued evaluation of the spatial and temporal variation in erosion to determine percentage of “doomed” nests each season.

Performance metrics

- Evaluation of hatching success in relocated nests.
- Evaluation of the percentage of nests relocated each season.
- Evaluation of hatching success *in-situ* and in relocated nests.
- Evaluation of sand temperature *in-situ* and in relocated nests.
- Evaluation of sex-ratios *in-situ* and in relocated nests.

2. Standardized and reliable monitoring**Description**

Local villagers are currently hired to 1) count nests laid the previous night and record the number of depredated or inundated nests on daily morning patrols; 2) evaluate hatching success; and 3) measure, tag, and collect tissue samples from nesting females on night patrols. Sand temperatures have also been recorded.

Current actions

- Consistent season-long monitoring of Sasakolo, but only sporadic monitoring of Litogahira.
- Development of a standardized monitoring protocol underway.

Future actions required

- Equipment for communication, transport and data management.
- Training workshops on data collection, tagging, nest counts and the basic biology of leatherback turtles.
- Monitoring of sand temperature in different sections of beach to determine variation in temperature along the beach and among seasons.
- Coordinated data collection and collaboration among landowner communities.
- Implementation of the Action Plan developed by the Tri-national Memorandum of Understanding among Indonesia, Solomon Islands, and Papua New Guinea to support field conservation efforts and establish effective institutional and funding mechanisms to implement management activities in a sustainable manner.

Performance metrics

- Regular verification and reporting of data.
- Regular evaluation of the program and research conducted by the different partners.

3. Exploitation of females and eggs

Description

In the past, extensive exploitation of eggs and slaughter of nesting females occurred. Currently, conservation activities appear to have minimized this threat on the index-beaches, although occasional egg collection is reported. Extensive exploitation of eggs and females is rumored to occur outside the index areas.

Current actions

- Employment and training of local villagers and ownership of the nesting beach program.
- Incentive programs for nest protection.

Future actions required

- Education and outreach programs.
- Addressing community needs and developing socioeconomic activities.
- Increasing the sense of responsibility in the villagers for their turtles and resources.
- In-depth evaluation of nesting status and exploitation of eggs and females at non-index beaches.

Performance metrics

- Regular evaluation of number of females and nests exploited every nesting season on index and non-index beaches.
- Regular review of the villagers' involvement in the conservation of their turtles and resources.

4. Conservation areas/marine protected areas

Description

Initial work has been undertaken for Sasakolo to become a protected area under the Isabel Resource Management and Protection Ordinance and for Tetepare and Rendova through the Western province Resource Management and Protection Ordinance. The Sasakolo and Litogahira nesting beaches are gearing towards protection under the TNC community outreach programs on Isabel province and fishing access to these sites is going to be addressed as part of the consultation and management approach.

Current actions

- Negotiations are underway.

Future actions required

- Establishment of the Sasakolo and Litogahira Conservation Areas.
- Development and enforcement of management plans.
- Hiring of a local DEC Officer for Conservation Areas.

Performance metrics

- Regular evaluation of enforcement, community agreements and management plans.

5. Non-index beach surveys***Description***

Only the beaches of Sasakolo and Rendova and Tetapare are consistently monitored. Logistical issues have prevented regular evaluation of nesting at other beaches in Solomon Islands.

Current actions

- Occasional aerial surveys.

Future actions required

- At least one survey, on foot or aerially, at or just after the peak of the nesting season to obtain an estimate of nesting activity.
- Establishment of continuous monitoring on Litogahira.

Performance metrics

- Use nest counts to determine the importance of as well as the spatial and temporal variability in nesting at these beaches.

IV. VANUATU

Background and current situation

Leatherback turtles have only recently been reported nesting in Vanuatu. Petro et al (2007) reviewed archival data and unpublished reports as well as interviewed key informants from coastal communities and found that leatherback nesting previously occurred more widely on Vanuatu Islands but probably still occurs at Pentecost, Ambrym, Malakula, Epi, and Efate.

A nesting beach survey was carried out on the beaches of Volta on southwest Epi Island from November 2002 to February 2003 that confirmed nesting. The survey recorded 31 nests, and tagged 9 leatherbacks; this is the most important nesting beach in Vanuatu with approximately 10–15 nesting females. Additional surveys in 2005 in Ambrym identified nine nests. It is not clear whether the nesting beaches in Vanuatu represent a local nesting population or opportunistic nesting by turtles going to other nesting beaches in PNG or the Solomon Islands. However, there appears to be low scattered nesting on at least four or five beaches. Leatherbacks are opportunistically consumed in some areas, particularly Malakula, where five have been reported killed in the past 7 years; the eggs are occasionally collected. Satellite tagging in PNG has shown that Vanuatu falls on the migratory route between feeding and nesting areas.

The major organization that has carried out turtle conservation in Vanuatu is “Wan Smolbag” (WSB) an environmental theatre company (Petro 2002). Recently a new Fisheries Act has been promulgated in Vanuatu. This act gives responsibility to the Vanuatu Department of Fisheries to manage turtles and turtle nesting beaches. The Department of Fisheries is expected to play a greater role in turtle conservation in the future. Sporadic funding and limited staff have prevented extensive turtle work in Vanuatu. Because of the decline in leatherbacks in the Pacific, even low nesting beaches like Vanuatu require attention.

Issues to be addressed

The issues to be addressed include:

- 1) Low hatching success: a) impact of animals and b) inundation and erosion.
- 2) Extensive beach surveys.
- 3) Standardized and reliable monitoring.
- 4) Safeguarding nesting habitats and addressing exploitation of females and eggs.
- 5) Establishment and enforcement of protected areas.

1a. Impact of animals

Description

Feral and domestic dogs, pigs, cows and horses were identified as threats to turtle nests during recent surveys.

Current actions

- None

Future actions required

- Evaluation of the intensity of impact by the different animals.
- Protection of nests.

Performance metrics

- Regular data collection on number of nests impacted each season after management procedures have been installed.
- Continual evaluation of methodologies implemented to mitigate negative impacts on incubating nests.

1b. Inundation and erosion***Description***

Flooding and storm surges were found to destroy nests during the recent survey.

Current actions

- None

Future actions required

- Relocation of vulnerable nests to more stable sections of beach.
- Continued evaluation of the spatial and temporal variation in erosion to determine percentage of “doomed” nests each season.

Performance metrics

- Evaluation of hatching success in relocated nests.
- Evaluation of the percentage of nests relocated each season.

2. Extensive beach surveys***Description***

The most recent surveys have provided some information on nesting in Vanuatu, but more extensive coverage is required spatially and temporally to better evaluate the nesting status. Nesting in other areas and islands of Vanuatu including other beaches in Epi and Ambrym has been reported.

Current actions

- Efforts to identify potential nesting areas.

Future actions required

- Follow-up nesting beach survey on Epi Island to cover the whole nesting period.
- Travel to potential nesting sites to collect information from monitors and the local communities on high potential nesting areas.
- Aerial surveys of high potential nesting sites during peak nesting.

Performance metrics

- Identification of index and non-index nesting beaches.
- Estimate of the number of leatherbacks nesting in Vanuatu.

3. Standardized and reliable monitoring***Description***

Vanuatu has a program of over 200 village turtle monitors located on most islands who serve as volunteers. This network is supported by one WSB staff member (part time) assisted by a Canadian turtle biologist volunteer (CUSO) with some support from senior monitors. Recent nesting beach surveys included: an assessment of the numbers and species nesting; tagging of nesting turtles and records of subsequent nesting; determination of numbers of hatchlings; and an assessment of the threats to nesting turtles, eggs, and hatchlings.

Current actions

- Training of turtle monitors adjacent to leatherback beaches in monitoring techniques and awareness raising activities.
- Monitoring of leatherback turtles by village-based monitors.
- Irregular surveys.
- Reporting of results and tagging data at the annual monitors' meeting.

Future actions required

- Implementation of a standardized monitoring protocol.
- Extensive training of local monitors.
- Regular monitoring of nesting beaches and night patrols.
- Evaluation of hatching success and factors impacting nests.

- Satellite tracking projects.
- Monitoring for an entire nesting season.
- Support for graduate and senior student projects that focus on leatherbacks.

Performance metrics

- Regular evaluation of the nesting beach program.

4. *Safeguarding nesting habitats and addressing exploitation of females and eggs*

Description

At Malakula turtles are still consumed and 5 leatherbacks were reported eaten or killed in the past 7 years, including one leatherback in February 2004. At Pentecost, one nesting female was reported eaten in 2000 in the South of the island. On Akhamb Island off southern Malakula, leatherbacks are avoided and not eaten due to their unusual appearance and belief that they are bad spirits. However, inland Malakula people that have more recently migrated to the coast in this area have no such beliefs and opportunistically harvest nesting females. Due to their size and mass, leatherbacks unlike other turtle species found in Vanuatu cannot be harvested when found in the sea, as they are too large to be hoisted into the relatively small coastal canoes. Therefore they are only harvested when found on nesting beaches. Increasing human population growth, including migration to more remote coastal areas and subsistence pressure on nesting females and eggs has probably led to observed declines in nesting. WSB has raised awareness on turtle conservation that has resulted in over 150 villages participating in turtle conservation.

In 2006 the Vanuatu Environment Unit was about to approve a sand mining permit in the middle of the leatherback nesting beach in Ambrym. They were not aware that it was an important nesting beach and only after rapid intervention from WSB were they convinced that an Environmental Impact Assessment was required.

Current actions

- Awareness campaigns: a tour of most of the Vanuatu Islands with a turtle play and organization of awareness workshops.
- Appointment of over 200 knowledgeable individuals as turtle monitors (Petro 2002; Johannes and Hickey 2004) who work voluntarily within their island areas and have subsequently evolved into coastal resource monitors who advise village chiefs and elders on appropriate sustainable management practices.
- Documentation of the impact of this program and video production to promote further awareness regarding village-based turtle management issues.
- Recruitment of local villagers in sea turtle monitoring.
- Annual meeting for sharing information and updating the monitors.

Future actions required

- Evaluation of the extent of the exploitation of females and eggs.
- Evaluation of the impact of sand mining.
- Addressing community needs, including education and health care supports and developing socioeconomic activities.
- Increasing the sense of responsibility in the villagers for their turtles and resources.
- Expansion of the education and awareness program.
- Rewards to the Vanuatu coastal communities from the International Sea Turtle Community for their conservation efforts.
- Ecotourism and education scholarships.

Performance metrics

- Regular evaluation of number of females and nests exploited every nesting season on index and non-index beaches.
- Regular review of the villagers' involvement in the conservation of their turtles and resources.
- Evaluation of community perception of and participation in turtle conservation activities.

5. Protected area***Description***

The new Vanuatu Fisheries Act has specific clauses for dealing with leatherbacks.

Current actions

- None

Future actions required

- Ensure that it is widely known that leatherback nesting beaches are either gazetted areas or on a list known to both the Environment Unit and the Department of Fisheries.

Performance metrics

- Awareness of the Vanuatu Government Departments, particularly Fisheries and Environment department, of all known leatherback nesting beaches and the appropriate protection given to these beaches.

V. MALAYSIA

Background and current situation

In Malaysia, the major nesting rookery at Rantau Abang in Terengganu has collapsed from over 10,000 nests in 1956 to less than 10 nests in recent years (Chan and Liew 1996). This dramatic decline has been attributed to intense egg harvest (legal and illegal), tourism, coastal development and accidental captures in oceanic and coastal fisheries. Efforts have been intensified by the state authorities of Terengganu to protect the few remaining nests laid and curtail the impact of coastal fisheries. A ban on the consumption of leatherback eggs in Terengganu has been enforced since 1989. Since then, all leatherback eggs are incubated in protected hatcheries. Total and partial sanctuaries have been established in the region and Rantau Abang has been declared a Turtle Sanctuary. An offshore Fisheries Prohibited area has been declared for 3 nautical miles offshore along the 13-km Rantau Abang sanctuary.

Issues to be addressed

The issues to be addressed include:

- 1) Low hatching success.
- 2) Significantly reduced nesting.
- 3) Need for a national legal framework.
- 4) Need for non-index beaches.

1. Low hatching success

Description

Malaysia has wide experience in running hatcheries and hatching success has averaged between 40 percent to 50 percent, which is well within acceptable limits. However, past overexploitation of eggs and other factors have resulted in the decimation of the Terengganu leatherback population. This has resulted in severely reduced nesting and nests. It is possible that there is a shortage of males in the population due to past hatchery practices when managers were ignorant of the effects of temperature on the sex of hatchlings. Lately, this has been addressed by incubating some of the eggs in cooler nests. However, leatherback eggs incubated for the past 6 years have produced very poor to zero hatching success; research is much needed to identify the causes.

Current actions

- Hatchery practices were optimized for hatchling production.

Future actions required

Identify the causes of hatching failure including:

- Determining if hatching failure is due to egg infertility due to possible shortage of leatherback males.
- Investigating a translocation experiment of known fertile eggs from other major nesting beaches (from other countries).

Performance metrics

- Evaluation of research results.
- Evaluation of experimental trials.

2. Significantly reduced nesting***Description***

The number of nesting leatherbacks at Rantau Abang has declined significantly to less than 10 nests per year. However, hatchery output in the past 50 odd years has been over half a million hatchlings. The question is what has happened to these hatchlings as they presumably matured into adults. Could they still be out there and if so, why are they not returning to nest?

Current actions

- Leatherback nesting beaches as sanctuaries.
- Leatherback tagging program.
- Occasional education and awareness programs.

Future actions required

- Determine if there are adult or juvenile leatherbacks remaining in the area and if so, assess their numbers.
- Start a turtle watch program among the offshore oil-rig workers.
- Develop observer programs for offshore fishermen.
- Assess if lights from oil-platforms and night fishing activities could have deterred leatherbacks from nesting.
- Conduct satellite tracking of leatherbacks found on the nesting beaches and in offshore waters of Terengganu.

- Conduct a population genetic study on remaining leatherbacks.
- Extensive education and awareness program.

Performance metrics

- Evaluate research results.

3. Need for a national legal framework

Description

According to the National Constitution, sea turtles are under the jurisdiction of each state; therefore, there is no National legislation to protect and conserve sea turtles. Each state has its own legislation and some states do not have any.

Current actions

- A draft of the National legislation is already available but has not yet been finalized.

Future actions required

- Consultations, including awareness programs with all the stakeholders before this can be presented to each state government for acceptance and approval by the state legislature.

Performance metrics

- Acceptance of draft legislation by all stakeholders.

4. Non-index beaches

Description

There has always been low-level scattered nesting by leatherbacks on other beaches in Malaysia. These nesting areas have become more prominent and important as the nesting in the major rookeries has declined. However, most of these nests are not protected and are lost or poached; some are not reported. There is a need for a program to ensure that every nest is given an opportunity to produce hatchlings.

Current actions

- Occasional reports of nesting.
- Occasional education and awareness programs.

Future actions required

- Development of an awareness program at the national level to encourage the public to report such nesting to the relevant agencies.
- Inform the public about what to do with the turtles and their eggs.

Performance metrics

- Sample survey to evaluate effectiveness of the campaign.

VI. SOCIALIST REPUBLIC OF VIETNAM

Background and current situation

The six central provinces of Quang Binh, Quang Tri, Quang Nam, Thua Thien-Hue, Quang Ngai and Binh Dinh historically hosted a significant leatherback nesting population with an estimated 500 females nesting annually as recently as the 1960's and 70's (Hamann et al. 2005). A recent assessment of the status of leatherbacks based on interviews with fisherman and other coastal residents indicates that only a remnant nesting population remains with fewer than 10 nests estimated per year (Hamann et al. 2006). This probably is an underestimate as the potential nesting beach encompasses over 500 km within the six previously mentioned provinces, with much of it undeveloped and none of it surveyed until 2007, hence, nesting is largely unreported. Although all marine turtles are protected by National Decree since 2002, nests and nesting females are subject to local harvest with the exception of a short 14-km stretch of beach in Quang Tri Province where a community-based conservation project began in 2007. Foraging adult size leatherbacks are observed along the nearshore coast of Quang Ninh to Quang Tri Province Pang (2006) and leatherbacks are routinely captured by gill net fishers according to fisher volunteers working with the Quang Tri leatherback conservation project (E. Possardt, pers. comm.).

Issues to be addressed

The issues to be addressed include:

- 1) Current status of leatherback nesting.
- 2) Exploitation of females and eggs.
- 3) Training and capacity building.
- 4) Public awareness.
- 5) Bycatch of leatherbacks in gillnets and other fishing gear.
- 6) Research on genetic structure of nesting population; population origins of foraging leatherbacks; internesting and post-nesting movements; and nesting and hatching success

1. *Current status of leatherback nesting*

Description

The historic nesting beach encompasses over 500 km from Quang Ninh Province south to Binh Dinh Province. Recent estimates of the low level of nesting are based on interviews with a sample of coastal residents and incidental reports of nesting. Consequently there is no accurate estimate of the distribution or level of nesting.

Current actions

- Initiation of a community-based leatherback program was initiated in 2007 by IUCN Vietnam and Quang Tri Division of Fisheries funded by USFWS MTCA. The project involves two communes that patrol 14 km of nesting beach throughout the nesting season.

Future actions required

- Annual aerial surveys of nesting beaches from Quang Ninh south to Binh Dinh (approximately 500 km) to determine the distribution and level of nesting.
- Expansion of ground surveys with additional community projects to cover 50 percent of the nesting beach with greatest likelihood of nesting based on historic and current records and community reports.

Performance metrics

- Evaluation of the annual data collection on number of nests and location.

2. *Exploitation of females and eggs****Description***

Currently a low but undetermined level of leatherback nesting occurs along approximately 500 km of Central Vietnam coast as described above. How and where to develop new community-based projects and direct resources to protect turtles and nesting females is difficult but it is essential to expand protection on the nesting beaches to ensure the survival of every nesting female and hatching success of every clutch if the leatherback in Vietnam is to have any possibility of recovery. Sea turtles are protected by National Decree signed in 2002. However, without a community-based conservation project and presence on the nesting beaches nesting turtles and eggs are routinely taken by local residents.

Current actions

- Initiation of a community-based leatherback conservation project by IUCN Vietnam and Quang Tri Fisheries Division in two communes in Quang Tri Province with USFWS MTCA funding. The project covers 14 km of nesting beach.

Future actions required

- Expand community-based conservation programs to ensure protection of nesting females and eggs on an additional 250 km of nesting beach determined to have the greatest likelihood of nesting based on current and historic nesting data and knowledge of local community residents.

Performance metrics

- Number of nesting females successfully nesting.
- Number of nests and nesting females poached.

3. *Training and capacity building****Description***

Community surveyors need training in survey requirements, species identification, tagging and nest protection protocols. This will be accomplished with local workshops and travel to Con Dao green turtle project which is the only successful and experienced project in Vietnam.

Current actions

- Only two communes with approximately 30 volunteer surveyors currently are working on leatherback nesting beaches. Two surveyors from each community are scheduled each year to visit the Con Dao green turtle project for training while all volunteers attend an annual training meeting.

Future actions required

- As the number of communities involved in conservation increases to meet the goal of ground coverage of 50 percent of nesting beaches, more training workshops and travel to the Con Dao turtle project will need to occur. Additionally there is a need for additional training for professional project personnel from Provincial and National institutions that oversee local projects. This will occur through visits to other successful projects within the region.

Performance metrics

- Number of workshops and participants.
- Number of volunteers attending training at Con Dao.
- Training site visits for professional project personnel.

4. *Public awareness****Description***

In spite of the National Decree protecting sea turtles, nesting females and eggs are routinely killed and collected where community conservation programs are not in place. About 80 percent of Vietnam's population resides along its coast.

Current actions

- Public awareness is addressed largely through the presence of community volunteers on the beach and through commune meetings.

Future actions required

- Expansion of community awareness programs throughout the hundreds of communities along the six provinces with historic leatherback nesting.

Performance metrics

- Materials produced and distributed.
- Teachers trained and classes presented in school.

5. Bycatch of leatherbacks by gillnet and other gear types***Description***

Thousands of gillnets are set along the coastal areas of the six provinces with historic or current leatherback nesting beaches. Nets are monitored and turtles are usually captured alive but fishers usually kill turtles for meat or because they are considered bad luck and also damage nets.

Current actions

- Initiation of community-based conservation programs at two communes in Quang Tri Province in 2007 by IUCN Vietnam and Quang Tri Fisheries Division that includes community awareness programs and volunteers that document accidental captures.

Future actions required

- Expand community programs with fishers along 50 percent of nesting beach (250 km) and enlist in volunteer programs
- Create fund for net repair for communities committed to disentangling and releasing captured turtles unharmed and photographed.

Performance metrics

- Number of community-based programs and volunteer fishers enrolled in program.
- Number of turtles released unharmed.

6. Research Needs

Background

Basic biological information as identified above is essential to develop and implement a recovery program for the leatherback population of Vietnam.

Current Actions

- There has been no basic research (as identified above) on the leatherbacks of Vietnam nor is there in any underway.

Future Actions Required

- Determine nesting and hatch success.
- Determine genetic structure of nesting and foraging population.
- Determine inter-nesting and post nesting movements.

VII. REGIONAL REQUIREMENTS

In addition to these country based actions, regional requirements to foster this regional conservation network include:

- 1) Implementing an exchange program (researchers, community members, etc.).
- 2) Sharing of educational materials.
- 3) Convening an annual leatherback working group meeting to review performance metrics, coordinate research strategy, etc.
- 4) Incorporate an Action Plan into appropriate existing regional plans, such as:
 - BSSE Tri-National (Papua New Guinea-Solomon Islands-Indonesia),
 - Sulu-Sulawesi Marine Ecoregion (SSME) Action Plan (Malaysia-Phillipines-Indonesia),
 - Turtle Islands Heritage Protected Area (TIHPA) (Malaysia-Phillipines),
 - Indian Ocean and South-East Asia Memorandum of Understanding (IOSEA -MoU) and
 - Secretariat of the Pacific Regional Environment Program (SPREP).

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Appendix 3: Coastal Fisheries Working Group: Report

The Coastal Fisheries Working Group was tasked to identify and describe issues related to coastal fisheries and sea turtle interactions, particularly leatherbacks. Brief information on current and future actions was discussed and compiled in the table below. Specifically, the group identified areas that experience high densities of leatherbacks in order to introduce conservation measures such as seasonal closures, training, observer programs, gear modification, and offsetting economic impacts on the targeted fishers.

The group applied the following geographical framework (nesting sites, internesting habitats, migratory routes and foraging areas) to examine existing information, impacts of fisheries on turtles and priorities in I) Vanuatu and Solomon Islands; II) Indonesia; III) Papua New Guinea (PNG) and IV) Malaysia. The group acknowledged the need for further research for a more comprehensive and representative picture of issues and actions in all the relevant countries.

In determining the priorities for future actions, the group envisaged the importance of applying the following guiding principals and cross-cutting initiatives during implementation.

Guiding principals:

- 1) Workshop and training for dissemination of information and raising awareness.
- 2) Consistent coastal database across the region and capacity to handle data management and sampling is required.
- 3) Capacity building for managing and minimizing fisheries impacts on turtles.
- 4) Consider climate change impacts at different scales.
- 5) Consider enhancing the ownership of the database developed.
- 6) Fisheries will change – the framework adopted needs to reflect the dynamic changes.
- 7) Long term planning, data collection, responses and commitment are important.
- 8) Compliance and enforcement are critical.

Table A3.1. Overview of existing actions and priorities to address the interactions of coastal fisheries and sea turtles.

Impacts on	Issues	Solomon Islands and Vanuatu	Indonesia	Papua New Guinea	Malaysia: Rantau Abang, Terengganu
Nesting	Research action: identify when & where.	High research priority especially when.	Well identified.	High research priority on both when and where.	Seasons and location identified.
	Direct takes.	Yes.	Yes. (Kei islands - High research priority).	Low likelihood.	No.
	Incidental take.	Low probability of interactions. Low level longlining and artisanal gillnet, hand lining.	High level of effort (coastal longline, coastal gillnet, trawling). High research priority.	Low probability of interactions. Low level longlining and artisanal gillnet, hand lining.	Known in gillnets, trap lines, trawls. High research priority.
	Habitat effects from gear.	No.	Unknown - but perhaps high.	Unknown - probably low.	Minimal: Small scale trawlers, anchovy purse seines.
	Ecosystem effects of fishing that affect food web and impact on hatchlings.	No.	High.	Unknown - probably low.	Unknown - require investigation.
Internesting	Research actions: Identify exactly where internesting areas are, refine where interactions occur and when (through observers, surveys).	i) Aerial surveys to identify turtle aggregations. ii) Tagging.	i) Aerial surveys to identify turtle aggregations. ii) Tagging. High priority for observer program.	i) Aerial surveys to identify turtle aggregations. ii) Tagging.	i) Satellite tracking. ii) Tagging. High priority for observer program).
	Impacts and existence of spatial and temporal closures.	Impacts nonexistent at present but may become useful in the future.	Unknown to the group.	Impacts nonexistent at present but may become useful in the future.	i) Rantau Abang sanctuary: closure all year round. ii) Zoning regulation (closure to trawling within 5 nm boundary to shore).
	Illegal and unauthorized fishing.	No.	Yes.	No.	Yes (violation of zone and gear restrictions).
	Identify and quantify fisheries & communities which are high risks to turtles (ports and villages).	Low risk.	Largely known but additional research is needed.	Low risk. Little known but research needed.	Yes.

Impacts on	Issues	Solomon Islands and Vanuatu	Indonesia	Papua New Guinea	Malaysia: Rantau Abang, Terengganu
Interesting (continued)	Interaction with fishing communities to explore economic opportunities during closed season:				
	i) Fishery and employment outside of the fisheries sector.	Could be applicable in cases where size of turtle population and number of interactions could be defined.	Time area closures and mitigation measures could be applicable in cases where level of densities could be defined. High priority for experiment of gear mitigation. High priority for fishers' training workshops.	Could be applicable in cases where level of densities could be defined.	Information on socioeconomic profile available except for conservation instruments such as incentives and payments. High priority for gear mitigation measures and fishers' training workshops.
	ii) Conservation related activities for fishing communities.	Low opportunity.	High opportunity.	Low opportunity.	High opportunity.
	iii) Alternative income and employment generation to fisheries.	Medium opportunity.	Probably low.	Low opportunity.	High opportunity (esp. inter-generational to discourage out migration by younger generations by providing more opportunities).
	iv) Opportunities for employment outside of the fisheries sector, especially for the young and educated.	Unknown: good to categorize.	Limited information. Needs updating.	Documented. Needs updating.	Well documented, few alternative income.
	v) Impacts of compensation instruments.	Unknown.	Unknown.	Unknown.	Unknown.

Impacts on	Issues	Solomon Islands and Vanuatu	Indonesia	Papua New Guinea	Malaysia: Rantau Abang, Terengganu
Migratory pathways to and from nesting areas	Research actions: identify exactly where and when interactions with fishing activities occur.	Preliminary information but more needed. High research priority.	Preliminary information but more needed. High research priority.	Preliminary information but more needed. High research priority.	Data needs updating.
	Define fisheries operating in area:	Not documented. High research priority.	Not documented. High research priority.	Documented. More information needed on migratory pathways.	Documented. More information needed on migratory pathways.
	i) Need for observer program (include communities) to document authorized fishing activities.	Low priority.	High priority.	Low priority.	High priority.
	ii) Identify illegal and unauthorized fishing activities.	Low priority.	High priority.	Medium priority.	High priority.
	Assess relative impacts on turtles by fishery/gear:	Low likelihood but minimal information.	Preliminary information but more needed. High research priority.	Low likelihood but minimal information.	High priority and likely high impact.
	i) Direct and indirect mortality.	NA.			
	ii) Implement and develop mortality mitigation measures with fishers.	NA.			
	iii) Explore different incentives for adoption (such as compensation payments) and their corresponding effectiveness of adopting mortality mitigating measures.	NA.			
Foraging	Research action: when and where. Define fisheries operating in area: i) Need for observer programs. ii) Identify illegal and unauthorized fishing activities. Assess relative impacts on turtles by fishery/gear: i) Direct and indirect mortality. ii) Implement and develop mortality mitigation measures with fishers. iii) Explore different incentives for adoption (such as compensation payments) and their corresponding effectiveness of adopting mortality mitigating measures.	Unknown. Must also consider high seas fishing.	Yes. (Foraging areas in Raja Empat area gazetted. Management action plan needs to be supported).	Unknown. Must also consider high seas fishing.	Unknown. Must also consider high seas fishing.

Shaded areas represent high priorities identified by the group.

Appendix 4: Regional Conservation Schemes Working Group: Report

The Regional Working Group had as its mandate to identify existing mechanisms that are already serving to coordinate regional efforts, and that will continue to provide regional networking services for governments and non-governmental organizations concerned with Indo-Pacific leatherback conservation. These mechanisms provide wide-ranging coordination functions as envisaged in the “Conservation Network Facilitation” section of the Business Plan, and could help avoid the need to develop another coordination body in parallel. These existing mechanisms would welcome the establishment of a dedicated fund that would strengthen their ongoing coordination efforts, described below.

Tri-National Partnership Memorandum of Understanding (MOU)

The MOU of a Tri-National Partnership between the Government of the Republic of Indonesia, the Independent State of Papua New Guinea and the Government of Solomon Islands on the Conservation and Management of Western Pacific Leatherback Turtles at Nesting Sites, Feeding Areas and Migratory Routes in Indonesia, Papua New Guinea and Solomon Islands, known as Bismarck Solomon Sea Ecoregion (BSSE) was formally signed during the 3rd meeting conducted in Bali on 28 – 30 August 2006.

The objectives of this Partnership are: 1) to promote the conservation of populations of Western Pacific leatherback turtles through the systematic exchange of information and data on research, population and migratory routes monitoring, nesting sites and feeding areas management activities for Western Pacific leatherback turtles, and by enhancing public awareness of the importance of conserving Western Pacific leatherback turtles and their critical habitats; 2) to harmonize marine turtle and marine conservation activities, sustainable use principles where ecologically viable and appropriate and incentives for turtle conservation across the Bismarck Solomon Seas Ecoregion; 3) to promote tri-national dialogue and partnership involving active participation by a range of stakeholders including national, state and local governments, site management agencies and owners, technical institutions, development agencies, industrial and private sector, non-government organizations, community groups and local people who share a responsibility in conserving Western Pacific leatherback turtles; and 4) to encourage national delivery of commitments under International and Regional Conventions and relevant agreements, including through the development of national systems of marine protected areas and responsible fisheries.

During the 3rd Meeting in Bali in August 2006, 6 priority areas of programs had been identified, i.e. 1) research and monitoring; 2) education and awareness and community development; 3) capacity

building; 4) funding mechanism (develop funding mechanisms to implement the MoU); 5) legal and policy issues; and 6) coordination and collaboration.

Based on these 6 priority areas of programs and threats faced by the Western Pacific leatherback turtle, a draft of Action Plan was developed in the BSSE Technical Meeting in Jakarta from 10 to 11 July 2007. One of the most important activities listed in the Action Plan is the protection of nesting beaches, foraging areas and migratory routes. Institutional arrangements have yet to be finalized, and will require resourcing.

Southeast Asian Fishery Development Center (SEAFDEC)

SEAFDEC is the regional intergovernmental organization serving the Southeast Asian Countries Forum on fisheries issues as well as marine turtles. The SEAFDEC organization consists of eleven signatory countries namely Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam and Japan. SEAFDEC had appointed the Marine Fishery Resources Development and Management Department (MFRDMD) in Kuala Terengganu, Malaysia to coordinate the regional research and conservation activities of marine turtles. Most of the regional marine turtle research and conservation activities had been funded by the Japanese government through the SEAFDEC Secretariat in Thailand. Since 1996 SEAFDEC had organized nine (9) regional workshops and seminars for obtaining the relevant regional information and enhancing the sea turtles population in the region. In the year 1988 SEAFDEC established the Regional Sea Turtle Tagging Code in order to promote the tagging exercises in the region. Recently in June 2007, SEAFDEC organized the Symposium on Satellite Telemetry of Sea Turtles in the Southeast Asian Region. Current regional research activities that are being conducted include: (i) population genetics studies of green and hawksbill turtles in the Southeast Asian Region; and (ii) regional satellite telemetry study in Malaysia, Myanmar, Thailand and Vietnam. Starting from 2009 to 2012 SEAFDEC will put in place a plan to conduct new regional research activities that include the protection and management on foraging habitats of sea turtles in Southeast Asia.

Indian Ocean and South-East Asian Marine Turtle Memorandum of Understanding (IOSEA-MoU)

The IOSEA-MoU on the Conservation and Management of Marine Turtles and their Habitats under the Convention on Migratory Species (CMS) has a comprehensive Conservation and Management Plan (CMP) and a secretariat that is financed through voluntary funding.

The IOSEA Marine Turtle MoU's Signatory States now totalling 27 coming from across the Indian Ocean – South-East Asia region, whose geographic scope intersects at its eastern limits with that of the Pacific initiative. Indonesia is already an IOSEA signatory, while Malaysia, Papua New Guinea and Timor-Leste are being encouraged to join the MoU.

The IOSEA Conservation and Management Plan covers all aspects of turtle conservation, including nesting beach management, identification and mitigation of fisheries interactions, and securing of funds for domestic and regional MoU implementation. A successful region-wide Year of the Turtle campaign was organized under the IOSEA auspices in 2006.

The IOSEA Marine Turtle MoU has a well-established reporting mechanism, including an extensive database on sites of importance for nesting, feeding and development in IOSEA member States.

The online database and its sophisticated analytical tools could be of value in identifying priority sites, regional threats to turtles and turtle habitats, and deficiencies in current conservation action. The IOSEA MoU Secretariat offers regional networking and coordination services through a dynamic website that facilitates timely exchange of information across the IOSEA region.

Secretariat of the Pacific Regional Environment Programme (SPREP)

The Secretariat of the Pacific Regional Environment Programme (SPREP), based in Samoa, is an intergovernmental organization charged with promoting cooperation, supporting protection and improving the environment of Pacific Islands countries and their territories' environment. SPREP³ membership comprises 16 Pacific Island countries, 4 territories and 4 developed countries, with the area served by SPREP covering some 32 million square kilometers. SPREP is the lead agency in coordinating marine turtle conservation in the Pacific Islands region.

The SPREP Marine Species Programme for the Pacific Islands Region outlines a strategy for the cooperative conservation management of shared dugong, marine turtle, whale and dolphin resources which will be implemented through Action Plans for 2008-2012.

The SPREP Marine Turtle Action Plan 2008 – 2012 (MTAP 2008-2012) and its implementation is the collective responsibility of SPREP member States, the SPREP Secretariat, partner non-governmental and intergovernmental organizations, and private sector organizations. The SPREP Secretariat will continue to play an important role in facilitating information exchange, coordination, capacity building, securing resources and regular monitoring and reporting on the implementation of the Action Plans.

It is recognized that, beyond existing in-country capacity, significant additional resources will be needed to achieve the aims and objectives of these Action Plans. We call upon all donor partners and supporters of SPREP's Regional Marine Species Programme to assist in providing the necessary resources to implement the Action Plans at regional and national levels.

The MTAP 2008-2012 is a regional action plan that covers the conservation of all species of marine turtles in the Pacific region. Activities carried out by any of its members whether it be at the national level or in tri-lateral agreements such as the Tri-National MoU would fulfil the actions under the SPREP Marine Species Action Plan 2008-2012.

The MTAP 2008-2012 was presented at the 18th SPREP meeting in September 2007 for endorsement. One of the high priority actions in the MTAP 2008 – 2012 is for member States to decide by 2008 whether to participate in a CMS arrangement that would create a new pan-Pacific agreement on turtle conservation.

3 SPREP members include American Samoa, Australia, Cook Islands, Federated States of Micronesia, Fiji, France, French Polynesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, New Zealand, Niue, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, United States of America, Vanuatu, Wallis and Futuna.

Western Pacific Regional Fishery Management Council (WPRFMC)

The United States Western Pacific Regional Fishery Management Council is one of eight regional fishery management councils established by the Magnuson Fishery Conservation and Management Act of 1976. Amended in 1996 to prevent overfishing, minimize bycatch and protect fish stocks and habitat, it is now called the Magnuson-Stevens Fishery Conservation and Management Act (MSA).

The Council is made up of 16 Council members, Council staff and several Council advisory groups. The Council process is a bottom-up process, emphasizing public participation and involvement of fisheries management at the local and community levels. Council decisions are based on the best available scientific information provided largely by the Pacific Islands Fisheries Science Center and the Pelagic Fisheries Research Program and are transmitted to the Secretary of Commerce for approval. Management measures created by the Council and approved by the Secretary are implemented by the National Marine Fisheries Service (NMFS) Pacific Islands Regional Office and enforced by the NOAA Office of Law Enforcement, the U.S. Coast Guard 14th District and local enforcement agencies.

Western and Central Pacific Fisheries Commission (WCPFC)

The Western and Central Pacific Fisheries Commission was established by the coastal and fishing states of the Western and Central Pacific Ocean (WCPO) to ensure, through effective management, the long-term conservation and sustainable use of highly migratory fish stocks in the western and central Pacific Ocean. The establishment of the Commission, which held its first meeting in Pohnpei, Federal States of Micronesia (FSM), in December 2004, provides a mechanism for the coordination of conservation measures for highly migratory fish stocks throughout their range.

The Western and Central Pacific Fisheries Commission (WCPFC) is a new participant in Pacific Ocean regional efforts to understand the impact of fisheries for highly migratory fish stocks in the WCPO on sea turtles, including leatherback (*Dermochelys coriacea*), and to mitigate the affects of fisheries on these sea turtle populations.

The Commission currently has 31 Members, Participating Territories and Cooperating Non-Members (CCMs), comprising includes large distant water fishing fleets and Pacific Island Coastal States⁴. The CCMs meet in an annual meeting of the Commission to consider the advice and recommendations of its subsidiary bodies (a Scientific Committee, a Technical and Compliance Committee and a Northern Committee⁵) and to adopt decisions relating to administrative affairs of the Commission and conservation and management measures for target fish stocks and non-target or dependent species taken incidentally.

4 The 23 Members are: Australia, Canada, China, Cook Islands, European Community, Federated States of Micronesia, France, Japan, Fiji, Kiribati, Korea, Marshall Islands, Nauru, New Zealand, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Chinese-Taipei, Tonga, Tuvalu, Vanuatu. The three Participating Territories are: French Polynesia, New Caledonia and Wallis and Futuna. The two Cooperating Non-members are: the United States (including American Samoa, Commonwealth of the Northern Mariana Islands and Guam) and Indonesia.

5 The Northern Committee is responsible for stocks north of 20°N.

The Scientific Committee supports six Specialist Working Groups (SWG). Of note among these include the Ecosystem and Bycatch issues (EB-SWG) and is the Fishing Technology TWG, responsible for monitoring the impact of technological developments in WCPO tuna fisheries.

The Scientific Committee reviews available information in relation to WCPO tuna fisheries and advises the Commission on the impact of those fisheries on target and non-target stocks. The Technical and Compliance Committee advises on the implementation of a regulatory framework for WCPO tuna fisheries and develops procedures for monitoring compliance with conservation and management measures adopted by the Commission. Finally the responsibility for the development of criteria and guidelines for the implementation of measures to mitigate bycatch rests with the Technical and Compliance Committee.

Turtle bycatch information for fisheries targeting tuna in the WCPO is poor because logsheet and observer coverage is not evenly distributed. Until relatively recently bycatch information was not recorded in fishing operations (logsheets were designed to collect information for target species) and, where data were collected, turtles were only identified to a relatively high taxonomic level. In addition to the poor data set, more accurate estimates of turtle mortality are further complicated by the fact that there is no global standard for collecting critical information that will support the meaningful comparison of sea turtle bycatch information.

The WCPFC is a relatively young (it became operational in September 2005) regional fisheries management organization responsible for tuna fisheries which account for approximately 50 percent of the current global catch of tunas. A large diversity of fleets ranging from small-scale artisanal to large industrial, and representing established distant water fishing fleets and developing coastal state fleets, contribute to this catch.

In aspiring to achieve the objective of long-term conservation and sustainable use of highly migratory fish stocks in the Convention Area, as provided for in the WCPF Convention, there is also an explicit requirement for the Commission to adopt measures that 1) minimize waste, discards, catch by lost or abandoned gear, pollution originating from fishing vessels, and the catch of both fish and non-fish species, and 2) promote the use of selective, environmentally safe and cost-effective fishing gear and techniques.

In the relative short history of the Commission some progress towards incorporating these considerations in the principles it adopts for conservation and management is being made. Through small expert advisory groups working under the auspices of the Scientific Committee, and specifically the two committees concerned with ecosystem and bycatch and fishing technology (including technology that can be applied to mitigate bycatch), and utilizing the advice of the Technical and Compliance Committee in respect of implementation options, the Commission has adopted some initiatives to address turtle bycatch concerns. Among these include actions: to improve available information on turtle interactions in the WCPO tuna fishery; to promote research into mitigation options; and to require fleets to take action to reduce turtle bycatch. As additional information concerning turtle interactions in the WCPO fishery becomes available, and as additional mitigation measures are trialed, the Commission will review existing measures in an effort to minimize turtle encounters among WCPO tuna fleets.

Appendix 5: Conservation Finance Working Group - Business Plan Outline and Background Document

This section includes a business plan outline developed by the conservation finance working group. The second part of the appendix is a document used as background for the discussions about conservation fund options.

Come Back Leatherback

Business Plan Outline for a Pacific Leatherback Sea Turtle Conservation Fund

Executive Summary

1. The Focus: This is a fund for Pacific leatherback sea turtles

- a. Geographic coverage – The geographic focus is the entire Pacific Ocean Basin, in particular the full range of the Pacific leatherback sea turtle⁶
- b. Biology and life cycle
- c. Conservation status
- d. Human communities and policy structures – Describe the three systems and their interactions: biophysical, human (socioeconomic), and policy
- e. Threats
- f. Bellagio Blueprint consensus (as a limiting focus for fund)
 - i. The protection of all nesting beaches, starting with those of the Pacific leatherback
 - ii. Reduce turtle take in at-sea and coastal fisheries
 - iii. Establish pan-Pacific policy actions and
 - iv. Encourage sustainability in traditional use

6 As discussed in the report, the near-term focus will be on Western Pacific nesting beaches.

2. The Concept

- a. Vision – We will save the Pacific leatherback from extinction⁷ within 10 years
- b. Mission – To provide a fund mechanism that fully and sustainably supports the existing and future efforts to reverse the trajectory toward extinction of the Pacific leatherback
- c. Goals in support of the vision
 - i. The protection of all nesting beaches, starting with those of the Western Pacific leatherback
 - ii. Reduce turtle take in at-sea and coastal fisheries
 - iii. Establish pan-Pacific policy actions
 - iv. Encourage sustainability in traditional use
- d. Objectives in reaching goals

3. History and Accomplishments

- a. History of work of key players in region
- b. Describe international coordination networks that already exist
- c. Current capacity (human resources, training) and gap analysis
- d. The Bellagio Blueprint consensus and the inventory of progress to date
- e. How much money is being spent and by whom

4. The Future

- a. Core activities to achieve objectives (narrative incorporating costs of the needs of the conservation community)
- b. Gap analysis
- c. Timeline for effort
- d. Benchmarks

⁷ Reversing the trajectory -- there will be signs that we have established a solid base for the recovery. Note that there is a need to be careful to set realistic performance metrics, e.g. hatchling production has been maximized within ten years.

5. Competitive Benefits

- a. What will be done?
 - i. Conduct the analysis
 - ii. Put together the capital to make this happen
 - iii. Leverage the capital
- b. To what end?
 - i. Best bang for the buck
 - ii. The right people are in place, they need to be supported
 - iii. International scale
 - iv. Time horizon is long due to long-lived animals
 - v. Sustained aspect to funding

6. Products and Services

- a. Fundraising
 - i. Make it clear it is a primary responsibility of the fund manager to fundraise
 - ii. Make sure there is coordination of effort in regard to fundraising
 - iii. Make sure it is not just USA and work towards getting matching commitments (financial and in-kind) from host countries for the Pacific leatherback sea turtle habitats
- b. Financial management (investment criteria and policy)
 - i. Socially responsible investments
 - ii. Diversified portfolio with returns on investment (ROI) balanced against risk
 - iii. Currency risk
 - iv. Timing of liquidity
 - v. Selection and oversight of investment management

- c. Fund management (type of fund: endowed and non-endowed)
 - i. Leverage against other funds
 - ii. Network with other funders
 - iii. Reporting (government and private)
 - iv. International transfers mechanisms
- d. Grantmaking
 - i. Process, priorities and strategy (well founded, documented)
 - ii. Make sure there is no duplication of effort with regard to existing funds, such as Fish and Wildlife Service Sea Turtle Fund and National Fish and Wildlife Foundation International Sea Turtle Fund
 - iii. Committee formation and coordination
 - iv. Transparency and reporting

7. Revenue Model

- a. Telling our story (marketing)
- b. Every contribution adds 10 percent to an endowment given the long-term need of the species recovery
- c. What are sources of funding by type (international agency, national government agency, private foundation, public foundation, corporate foundation, corporations, estates, individuals)?
- d. Addressing funding matches from countries that host Pacific leatherback sea turtle habitat
- e. Sample list of targets for fundraising (and which are good for endowment funding, and which are not)
- f. What are our best opportunities for immediate funding?

8. Governance and Leadership Team

- a. Fund administration staff – The host of the Fund will hire staff appropriate to meet needs of the Fund
- b. Board – The board of the foundation that hosts the Fund

- c. Steering Committee [Bellagio Sea Turtle Conservation Initiative (Terengganu Workshop) and Fund Administrator Representative]
 - i. To advise on the development of the downstream fund program on behalf of the Bellagio participants
 - ii. Hire a contractor to fully develop the business plan
 - iii. Begin to set policy for priorities for grantmaking and fundraising
- d. Technical Fund Advisory Committee
 - i. Avoid conflict of interest
 - ii. Five representatives – Natural Scientist – Social Scientist – NGO – Law - Government
 - iii. Has substantive, technical expertise
 - iv. Provides technical review of grant proposals to give advice to the board
- e. Partnerships

9. Technology Requirements

- a. Online applications
- b. Online evaluations

10. Evaluation

- a. Designing feedback loops
 - i. Close and frequent communication with Steering Committee
 - ii. Regular communication with the greater leatherback community
- b. Milestones
 - i. Fundraising
 - ii. Conservation
 - iii. Capacity
 - iv. Process
- c. External, independent evaluation every five years

Background Document: Long-term Financing Strategies for Pacific Leatherback Conservation

Introduction

Conservation and recovery of Pacific leatherback sea turtles requires coordinated efforts on a number of fronts. Threats include directed harvest of eggs and turtles, bycatch in high seas and coastal fisheries, and habitat destruction. Some of these threats can be addressed through immediate, short-term actions (e.g. short-term research projects, publicity campaigns of finite duration, new regulations). Others will require making sustained conservation efforts over many years. For example, addressing threats on nesting beaches requires sustained efforts in the form of beach monitoring, moving nests, enforcement, and in some cases providing community benefits in exchange for conservation. The long-term success of this kind of site-based conservation relies on steady financial support over time, to provide continuity to conservation activities and finance recurrent costs. Site-level conservation tends to be difficult to raise funding for, and is the most vulnerable to temporary lapses in funding.

A conservation trust fund would ensure with legal protections that financial assets are set aside for these specific purposes, and made available according to pre-determined criteria. A Pacific Leatherback Turtle Conservation Fund (PLTCF) could focus on nesting beach protection in the Western Pacific (Indonesia, Papua New Guinea (PNG), Solomon Islands, Vanuatu, and possibly Malaysia). In contrast to the collapsed nesting populations in the Eastern Pacific, the Western Pacific populations represent some of the remaining major and promising nesting beaches for Pacific leatherbacks. In addition, without adequate numbers of hatchlings entering the population each year from these nesting sites, conservation efforts targeted at direct or incidental take of juveniles or adults are doomed to failure.

Current actions

Currently, most Western Pacific nesting beach projects are dependent on minimal short-term funding that must be raised each year and is vulnerable to budget shortfalls of funding agencies. Some critical nesting beaches do not currently have funding for conservation efforts. Some projects have enough funding to collect data, but lack the funds to undertake necessary actions such as moving nests, or providing incentives to communities to protect nests. The uncertainty vis-à-vis funding makes it difficult for stakeholders to engage in long-term planning. In addition, there is a significant risk that conservation investments made in some years will be lost in others when funding is low. In some cases, years of conservation efforts may be for naught if a lack of funding means that actions cannot be taken to address issues such as sand temperatures that are too high or communities that have lost interest in conservation.

The chapter on nesting beaches discusses the actions that are currently being taken on each major Western Pacific leatherback nesting beach and the actions that must be taken in the future to ensure survival of the population. The current levels of funding and required additional funding were discussed at the workshop and refined in the business plan. This information will determine the priorities for actions and size of the fund required to undertake those actions.

Future actions required

The recommendation is to establish a trust fund that is focused on maximizing hatchling production on leatherback nesting beaches in the Western Pacific. In this manner, the fund targets conservation activities that benefit most from a trust, i.e. long-term site-level conservation, rather than assuming that all activities related to conservation of leatherback turtles should be supported by the fund. It is important to remember that site-level conservation tends to be difficult to raise funding for, and is the most vulnerable to temporary lapses in funding. A conservation trust fund is the ideal vehicle for addressing these needs. Many other activities could enjoy the convenience of support from a trust, but they likely need not rely upon the continuity provided by a trust for their success. Such activities might either be given second priority for funding support, or be excluded entirely.

There are many ways in which a leatherback trust fund can be designed. These design options are considered in the following sections. The first section discusses the advantages of embedding the PLTCF within an organization that already operates existing funds. The subsequent sections consider governance, functions and staffing, asset management, size, and performance metrics.

1. Embedding the PLTCF within an existing fund

It is possible to establish a conservation fund through the creation of a new legal entity or through an existing mechanism that satisfies the proposed needs for funding conservation projects. Existing funds can accept a targeted donation (provided that it fits within the purpose of their organization), and manage such donations for specified purposes. The advantages of embedding the PLTCF in an existing fund rather than creating one anew are manifold:

- Establishment time and costs can be avoided.
- New trustees or staff for an entirely new organization need not be found - especially important for conservation funds where the market for experienced professionals is thin.
- Administrative costs may be shared with the existing fund, potentially creating savings from economies of scale.
- Asset management costs may be lower due to the association with a larger fund that has negotiating power with asset managers.
- Monitoring and evaluation practices may be more sophisticated in larger existing funds.
- Opportunities may exist for “matching” or leveraging donor funds.
- Uncertainty is diminished concerning the functioning of a completely new fund, which may be essential to gain donor confidence.

Using an existing fund has decided advantages, although there may be a real or perceived tradeoff in terms of the level of control over the fund. This tradeoff can be largely eliminated through the design of a legal agreement with the existing fund on the parameters of how the

new monies should be managed, including provisions for “no-objection” solicitations to donors or appointed representatives on key decisions. In effect, the use of an existing fund is like creating a directed “sub-account” for funding a specific cause.

Criteria for selecting an existing fund might include the manner in which decisions about projects will be made, the composition of the board of directors, the fund’s investment policy, and the breadth and cost of administrative services provided. The following may also be important considerations when choosing the organization to host the fund: international grantmaking experience, multi-year grantmaking capacity, small grant capability, and rapid response to urgent requests. In general, the design of the fund and the types and costs of services that can be provided by an organization will depend on the number, size, and length of projects funded and how large the fund is and whether it is an endowment or sinking fund. Another related consideration is how the financial support will be raised to capitalize this fund.

2. Governance of the fund

A trust fund is managed by trustees (or a board of directors) that have a responsibility to fulfill the fund’s purpose, within the specific guidelines set for them in legal documents that establish the fund. The document that establishes the fund (e.g. Deed of Trust, Articles of Incorporation, or other such legislation) specifies the purpose, geographic focus, management objectives, and scope of activities of the fund. Conservation funds must be governed by competent trustees or a board of directors with expertise in financial management, government and law, conservation project management, and civil society issues relevant to conservation. The trustees can be drawn from private financial institutions, conservation groups, development organizations, government, and civil society organizations representing conservation and social interests relevant to the purpose, geography, objectives, and scope of activities of the fund. Given that the PLTCF will be international in scope, the challenge will be to ensure appropriate geographic representation such that beneficiary nations have a sense of ownership of the fund and the activities that it finances in their countries. This can also be accomplished through the use of an advisory board.

Several fundamental responsibilities of the trustees or board of directors include:

- **Fulfilling the fund’s purpose:** The trustees or board of directors have a responsibility to use the fund’s money in a manner intended to fulfill the purpose set forth in its trust document. A logical framework and measurable performance indicators are highly recommended tools for focusing these efforts.
- **Administrative policies and procedures:** The trustees or board of directors are responsible for approving policies and procedures for the fund’s administration. Transparency and safeguards from mismanagement and fraud in all administrative processes are very important for donors and government regulators. GEF makes available examples of exemplary conservation fund policies and procedures on its website.
- **Fiduciary responsibility:** The trustees or board of directors must safeguard the fund’s assets from mismanagement or fraud, and ensure that they are invested in a way that allows for the fulfillment of the fund’s purpose. The trustees or board of directors will be

responsible for arranging, and reviewing the results of, a periodic independent audit by an accredited entity recognized by donors and government regulators.

3. Functions and staffing of the fund

There are at least three critical functions of a conservation fund, all of which can be performed by either internal staff or third parties.

- **Accounting:** The fund must maintain formal financial accounting. A fund may have a full- or part-time accountant, or may choose to call upon a third party accountant on a periodic basis. This will largely be determined by the number of transactions of the fund and the frequency of financial reporting required by donors.
- **External audit and regulatory compliance:** The fund's accounting should be audited by an external independent accountant. In addition, measures must be taken to satisfy regulatory requirements of the country in which the fund is incorporated. In both cases, an internal staff member should be charged with ensuring the auditor is contracted as needed, and that regulatory compliance is monitored and managed appropriately.
- **Asset management:** The money in the fund must be held securely, and in the case of an endowment, invested in assets that will generate a financial return over the long-term. Asset management is often performed by specialist third parties, although some larger funds maintain asset managers internally. Even if a third party performs asset management, internal staff may be necessary to ensure that investment reports are received and reviewed in accordance with fund policies and procedures.

There are four functions that are important, but are not necessarily included in all conservation funds. These functions are more difficult to perform via third parties, with the exception of performance evaluation, which in the best case scenario is performed by an external independent evaluator.

- **Grant processing:** A conservation fund may make grants to a number of entities, ranging from conservation groups to governments. In this case, the fund requires staff to solicit, receive, review, and respond to grant proposals. In those cases where grants are made, fund staff need to process those grants, including managing grant agreements, dispersing funds, and ensuring compliance with grant agreements.
- **Monitoring and evaluation:** The performance of grantees in achieving their conservation objectives should be monitored by the grantee and reviewed by fund staff. There is an increasing emphasis on the importance of contracting external evaluators periodically (e.g. every five years) to assess the overall performance of the fund.
- **Donor reporting:** Most donors will require annual, if not more frequent, reporting. Donor reports will likely include:
 - Asset management performance;
 - Accountability for funds; and

- Conservation activities performed with the funding and their impact (see Monitoring and Evaluation above).
- **Strategy:** Funds vary from passive grantors, allowing grantees to decide how best to do their job, to active participants in developing strategy. The trend today is to become more active in strategy. To do so, however, may require specialists on staff to assist in developing strategy and to manage grant-making such that the strategic objectives are fulfilled.

For a small endowed fund (up to US\$10 million), one individual can perform these functions, using third parties as needed. As funds grow in size and/or as the number of transactions increase, these functions may require a number of individuals to perform them. Larger funds can support expanded staffs of specialists to perform these various functions. Considering this basic list of fund functions, it should be apparent that to operate a fund well, a minimum scale is necessary to support the necessary operations.

4. Asset management

A conservation fund can operate as an *endowment* or a *sinking* fund. An endowment invests its assets and spends only a portion of its investment returns; it never spends its core capital. A typical endowment rule is to grant the equivalent of five percent of the asset base of the fund per year. Investment returns both replenish its expenditure as well as add to the fund to help it to grow and to offset inflation. A sinking fund holds its assets in short-term investments, and spends down the core capital of the fund over time. A conservation fund can also implement a combination of approaches, managing a specified amount as an endowment and another as a sinking fund – a normal way to accommodate more than one donor with differing requirements for the use and management of their funds.

A sinking fund has relatively straightforward asset management needs – a respected bank where a cash account can be established is generally all that is needed. An endowment is far more complex as a result of the need to invest the assets of the fund in such a way that the returns will exceed the rate of expenditure, and be stable enough to prevent major swings in the amount of money the fund can provide each year.

The board of directors will be responsible for developing an investment policy for an endowed fund. The investment policy will detail the range of acceptable investments, including asset class (e.g. cash, equities, bonds, real estate, etc.), quality rating (e.g. exclusion of high-yield debt), geographic location of asset management, and geographic location of investments. The investment policy should also set a range of acceptable fees that the fund can be charged by an asset manager.

An important criterion for selecting an existing fund will be to examine the terms of their asset management agreement. It is entirely possible that they have unacceptable asset management fees, warranting the selection of another existing fund. This is most likely in the case of existing national funds in developing countries, where asset management fees generally exceed one percent.

The board of the fund will need to select a suitable asset manager. They should fulfill the following criteria:

- 1) Major institution with strong international reputation.
- 2) Experience with services catering to management of endowments and foundations.
- 3) Access to U.S. and Western European markets and diversification across asset classes.
- 4) Total cost below one percent of total assets under management.
- 5) Clear and frequent reporting - the asset manager should have an integrated and automated information system for the management of and reporting on different sub-accounts following separate and distinct investment criteria.
- 6) Customized service - the asset manager should cater to the investment policy developed by the fund's board of directors.

5. Size of the fund

At the outset of designing a fund it will be important to determine how much it will cost on an annual basis to fulfill its purpose. That calculation should include the amount of money that the fund will grant to conservation projects each year, the cost of administering those grants, and the cost of managing the fund's assets.

In the case of an endowed fund, a base of capital will be required to generate investment returns equivalent to the amount of intended annual spending. The rule of thumb is to spend investment returns equivalent in value to no more than five percent of the fund's capital (based on a three-year moving average). While investment returns for the endowment will likely be greater than five percent (10 percent is not an unusual return for an endowment), this rule accommodates three factors that are critical to the financial sustainability of the fund: a) the capital base of the fund will fluctuate with investment markets – the five percent rule allows for returns in excess of five percent (good years) to be re-invested in the fund to offset years in which returns do not reach five percent (bad years); b) the fund will incur administrative and asset management costs in addition to the amount of money it grants for conservation projects; and c) inflation will erode the buying power of the fund – returns in excess of five percent will be reinvested to increase the capital base of the fund to help offset the effects of inflation.

Therefore, one can use the projected annual target for grant making from the fund to calculate the size requirement of an endowment using this simple formula:

$$\text{Endowment size} = \text{Annual funding target} / 0.05$$

As mentioned above, the fund will incur operating costs, specifically for administration and asset management.

- **Administrative costs** may include accounting, processing grants, monitoring compliance and performance, independent audits, and donor reporting. A ceiling for administrative cost might be 25 percent of the funding granted on an annual basis, although as the size of the fund increases that percentage should fall. This presents a challenge for smaller endowments. A fund will require a minimum level of infrastructure and personnel to fulfill its administrative responsibilities. However, if the endowment is small, it will not be possible to pay these costs and remain under the ceiling of 25 percent. At the same time, it makes little sense to allow the fund to exceed this limit, as the endowment becomes more of a means to support its own administration than a source of financing for conservation. An endowment of US\$10 million, with an administrative cost of 15 percent, is a reasonable minimum size to justify the administrative costs of a conservation fund. This is not to say that many small funds do not exist, nor should it imply that the administrative costs presented here are strict guidelines. It is up to the judgment of those creating the fund to determine what is reasonable.

Table 1: Endowment Size and Hypothetical Associated Costs (in US\$)

Annual Funding Target	Administrative Cost	Asset Management Cost	Endowment Size
\$ 100,000	\$ 25,000	\$ 20,000	\$ 2,000,000
\$ 500,000	\$ 75,000	\$ 100,000	\$ 10,000,000
\$ 1,000,000	\$ 100,000	\$ 200,000	\$ 20,000,000
\$ 2,000,000	\$ 200,000	\$ 400,000	\$ 40,000,000
\$ 10,000,000	\$ 500,000	\$ 2,000,000	\$ 200,000,000

Note: Table assumes: 1) asset management cost is one percent of endowment; 2) administrative cost falls from 25 percent to five percent as scale increases.

- **Asset management** is performed by professionals with experience in investing money. This service should cost no more than one percent of the capital under management, although many service providers charge more (especially those outside of the U.S.). Lower rates are possible and should be sought. This is especially true as the fund achieves larger scales, at which point asset managers may be expected to negotiate favorable rates.

6. Performance metrics

It is common to set forth in the logical framework measures of performance that reflect the effectiveness of the fund at fulfilling its purpose (e.g. number of turtle rookeries successfully conserved within the geographic focus of the fund). This helps to prevent investment in activities that may not ultimately contribute to fulfilling the purpose of the fund and forces trustees to maximize the effectiveness of each grant made by the fund. Further to this point, it is advisable to plan for independent monitoring and evaluation of the fund on a periodic basis (e.g. every five years). An external evaluator will need a clear statement of what the fund expected to accomplish and a description of how it went about working towards those objectives. A logical framework with *measurable* performance metrics is invaluable for this purpose. It may also be worthwhile to consider incorporating the costs of a project manager in each of the countries into the fund in order to aid in project design, implementation, and monitoring.

Appendix 6: Workshop Program and List of Participants

Workshop Program

Tuesday, 17 July 2007

0845 – 0915 Opening Ceremony

0845 – 0900 Welcome remarks
Kitty Simonds – Executive Director,
 Western Pacific Regional Fishery Management Council

0900 – 0915 Opening address
Y. B. Toh Chin Yaw – Chairman of the Terengganu State Health, Unity,
 Consumer Affairs and Environmental Committee

Plenary Session 1: Preliminaries

0915 – 0930 **Workshop purpose and overview**
Meryl Williams and Heidi Gjertsen

0930 – 1000 **Population review**
Peter Dutton – NOAA Fisheries Service (SWFSC)

1000 – 1030 **The importance of being earnest about protecting nesting habitat and nests**
Milani Chaloupka – Ecological Modelling Services

1030 – 1100 Photo session and coffee break

Plenary Session 2: Presentation of draft action plan chapters

1100 – 1130	Western Pacific nesting beaches Manjula Tiwari – NOAA Fisheries Service (SWFSC)
1130 – 1200	Southeast Asian coastal fisheries Bundit Chokesanguan – SEAFDEC
1200 – 1230	A socioeconomic assessment and survey of sea turtle-fishery interactions in Malaysia: Experience from Terengganu and North Pahang Yeo Bee Hong – The WorldFish Center
1230 – 1330	Lunch

Plenary Session 3: Presentation of draft action plan chapters (cont.)

1330 – 1400	Regional efforts (Tri-National MoU) Herry Djoko Susilo – Ministry of Forestry, Indonesia
1330 – 1400	Regional efforts (IOSEA) Douglas Hykle – Indian Ocean South East Asia Marine Turtle MoU
1400 – 1430	Regional efforts (Pacific Islands Marine Turtle Action Plan) Ann Trevor – South Pacific Regional Environment Programme
1430 – 1500	Conservation tools and incentives Heidi Gjertsen – NOAA Fisheries Service (SWFSC)
1500 – 1515	Coffee break
1515 – 1600	Long-term financing options Mark Spalding – The Ocean Foundation Michelle Pico – National Fish and Wildlife Foundation

Plenary Session 4: Discussion of additional topics and instructions for working groups

1600 – 1700	Discussion of additional topics and questions
1900 – 2100	Dinner Reception

*Wednesday, 18 July 2007***Plenary Session 5: Preliminaries**

0900 – 1030	Working groups: Discussion and revision of action plan chapters <ol style="list-style-type: none">1. Nesting beaches2. Coastal fisheries3. Regional efforts4. Long-term financing options
1030 – 1045	Coffee break
1045 – 1230	Working groups: Discussion and revision (cont.)
1230 – 1330	Lunch
1330 – 1515	Working groups: Discussion and revision (cont.)
1515 – 1530	Coffee break

Plenary Session 6: Questions and discussion

1530 – 1700	Questions and discussion of working group outputs
1915 – 2130	Field trip to Ma'Daerah Turtle Sanctuary

Thursday, 19 July 2007

0830 – 1030 **Working groups: Discussion and revision**

1030 – 1045 Coffee break

Plenary Session 7: **Presentations of revised action plan chapters**

1045 – 1230 **Presentations by working groups and discussion**

1230 – 1330 Lunch

1330 – 1515 **Working groups: Finalize comments and edits of chapters**

1515 – 1530 Coffee break

1530 – 1630 **Working groups: Finalize comments and edit chapters**

Plenary Session 8: **Wrap-up**

1630 – 1700 Wrap up for the day

Friday, 20 July 2007

Plenary Session 9: **Final presentations and next steps**

0900 – 1200 **Presentations by working groups and discussion on next steps**

1200 **End of workshop**

List of Participants

Mahfuzuddin Ahmed, Asian Development Bank
Milani Chaloupka, Ecological Modelling Services
Bundit Chokesanguan, Southeast Asian Fisheries Development Center (SEAFDEC)
Ray Clarke, NOAA Fisheries Service (PIRO)
John Claussen, Conservation and Community Investment Forum
Paul Dalzell, Western Pacific Regional Fishery Management Council
Kim Davis, WWF-US
Peter Dutton, NOAA Fisheries Service (SWFSC)
Brandee Gerke, NOAA Fisheries Service (PIRO)
Eric Gilman, Western Pacific Regional Fishery Management Council
Heidi Gjertsen, NOAA Fisheries Service (SWFSC)
Gae Gowae, Papua New Guinea Office of Environment and Conservation
Theodore Groves, University of California-San Diego
Martin Hall, Inter-American Tropical Tuna Commission (IATTC)
Kevin Hiew, WWF-Malaysia
Douglas Hykle, Indian Ocean and South-East Asian MoU (IOSEA-MoU)
Kamarruddin Ibrahim, Malaysia Department of Fisheries
Kenneth Kassem, WWF-Malaysia
Jeff Kinch, University of Papua New Guinea
Hock Chark Liew, Universiti Malaysia Terengganu
Paul Lokani, The Nature Conservancy
Rod Mast, Conservation International
Mike McCoy, Gillett, Preston and Associates
Li Ping Ng, The WorldFish Center
Amanda Nickson, WWF-International
Fred Pattson, Solomon Islands Department of Environment and Conservation
Lida Pet-Soede, WWF-Indonesia
Michelle Pico, National Fish and Wildlife Foundation
Earl Possardt, US Fish and Wildlife Service
Ketut Sarjana Putra, Conservation International
Richard Rice, Conservation International
Kitty Simonds, Western Pacific Regional Fishery Management Council
Mark J. Spalding, The Ocean Foundation
Dale Squires, NOAA Fisheries Service (SWFSC)
Herry Djoko Susilo, Indonesia Ministry of Forestry
Syed Abdullah Syed Abdul Kadir, Southeast Asian Fisheries Development Center (SEAFDEC)
James Tan Chun Hong, The WorldFish Center
Tan Teong Jin (TJ), Blue Mountain Press
Manjula Tiwari, NOAA Fisheries Service (SWFSC)
Anne Trevor, Secretariat of the Pacific Regional Environment Programme (SPREP)
Meryl Williams, Australia
Bee Hong Yeo, The WorldFish Center



*Participants of the Bellagio Sea Turtle Conservation Initiative
July 17-20 2007, Terengganu, Malaysia.*





On 17-20 July 2007, 45 experts on sea turtles, fisheries, conservation and finance from 10 countries convened at The Bellagio Sea Turtle Conservation Initiative workshop in Terengganu to focus on methods to save the imperiled Pacific leatherback from extinction. The group developed a strategic plan to guide the prioritization and long-term financing of Pacific leatherback turtle conservation and recovery objectives. Participants identified critical conservation actions and agreed that a business plan is urgently needed to reverse the trajectory towards extinction of the Pacific leatherback. The conservation actions prioritized by the participants encompassed protecting nesting beaches including eggs and nesting females; reducing direct and indirect turtle take in coastal fisheries; and strengthening regional and sub-regional cooperation. The group committed to work together on fundraising and implementation of these urgent conservation actions. This report presents outputs and the plan that was produced from the workshop.

ISBN 978-983-2346-62-3

June 2008

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